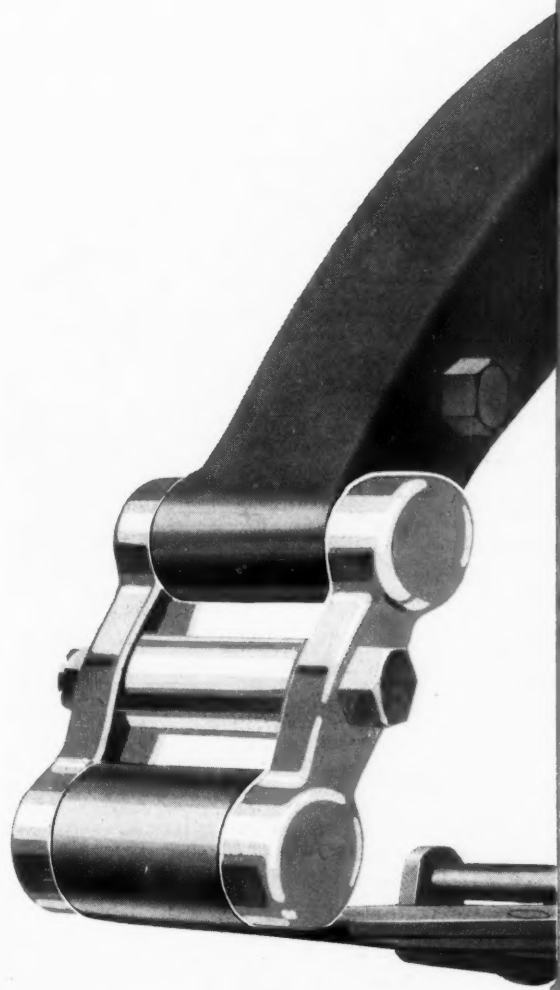


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Industry Prepares for *Banner* Year in 1928

All signs point to substantial business increase during next 12 months. Basic conditions sound. Car output likely to reach or exceed record set in 1926.

By Norman G. Shidle

THE automotive industry has every reason to enter 1928 with confidence and sincere, well-founded optimism. A few of the reasons may be summed up briefly as follows:

Final announcement of the Ford Model A will release a tension in the retail field that will benefit not only other car makers but also hundreds of firms in the parts, accessory and shop equipment field.

Increased total output of cars and trucks is assured, with definite advances reasonably to be expected by all well-managed companies individually. Ford will not account for the whole increase.

New car stocks in dealers' hands are in excellent condition. Few evidences of overloading exist as the industry enters the new year.

Export trade is growing steadily and gives every evidence of continued advances in 1928.

More attention will be given to service and selling service in 1928 than ever before. The result will be more car sales, more maintenance work, more parts sales, more shop equipment sales and more pleased consumers eager to spend a greater share of their dollar for automotive transportation.

Car prices are in stabilized condition, with marked revisions in near future highly improbable.

Greater dollar-for-dollar value in automotive products being offered than ever before.

General business conditions are thoroughly sound; practically all economic authorities feel that business is on the upgrade.

Total production of automobiles in 1928, as in 1927, depends largely on the activities of one company—Ford.

With business conditions in general on a sound basis, it takes no seventh son of a seventh son to predict, with reasonable assurance, that more automobiles will be built in 1928 than in 1927. But to say just how many more will be built is more difficult.

Taking all current factors into consideration, it seems likely that the United States and Canadian manufacturers will build a total of something like 3,900,000 passenger cars and somewhere around 500,000 motor trucks in 1928. A 5 or 6 per cent variation, one way or the other, from these figures would not be surprising.

Car Output Over 3,100,000

During the year just passed, with Ford practically out of the picture for the last six months, the total output of passenger cars has been slightly over 3,100,000 and the total output of trucks a bit more than 445,000. The total output of passenger car makers, exclusive of Ford, turned out to be nearly the same in 1927 as in 1926, although some very wide individual variations were recorded.

There will be still further individual variations in the next 12 months, but many of these doubtless will balance one another as they did in 1927. It is quite likely that producers, exclusive of Ford, will build at least as many and very probably quite a few more in 1928 than they did in 1927.

Ford unquestionably will sell a large number of cars in 1928, but 1927 experience indicates that many of Ford's sales are made to people who simply are not in the market for any other car, even though its price be only \$100 or so higher. When Ford had nothing to sell at the

[**O**PINION throughout the industry, among vehicle manufacturers, parts makers and dealers, leans strongly to the belief that 1928 automotive business will eclipse not only that of 1927, but also that of the record year 1926, when 3,929,542 passenger cars and 535,006 trucks were built. **]**

Ford price, this large group didn't buy anything. Many more Ford sales reasonably seem likely to come from people who previously have had only one car but who will both desire and be able to afford two, with the Model A available at present prices. The strong possibility that Ford will be unable to get into production at high rates as quickly as he is planning also is worth considering very definitely when trying to look ahead to the first half of next year.

Looking ahead in such general terms, however, is no longer of great value in the automotive field. The individual efficiency and initiative of specific organizations is playing a greater part every year. Witness the fact that, despite all companies, exclusive of Ford, having built about as many cars in 1927 as they did in 1926, only five out of a list of 15 important passenger car companies made as much money in the first nine months of 1927 as in the similar period of 1926.

Except for the huge \$52,735,126 net profit gain made by General Motors in three-quarters of 1927 as compared with three-quarters of 1926, and the large percentage increases over 1926 recorded by Hudson, Chrysler, Auburn and one or two others, the profit records of passenger car companies during the last year have not been favorable as compared with 1926. That fact must be borne in mind, regardless of total output figures.

The reasons for the relatively unfavorable profit showing in 1927 have been specific rather than general. That is the fundamental bright spot in the whole picture. There is nothing in the condition of general business, nor in basic economic trends, to indicate that real progress cannot be made by practically every one of these companies in 1928. One company, for instance, may have had its profits adversely affected by heavy investments in designing and producing an entirely new line; another may have made particular merchandising mistakes which hampered its immediate progress but threw no cloud over its long swing development; another may have suffered somewhat from the hindering hand of tradition in sales methods; another may have changed



TEAMWORK—practical cooperation—between the various branches of the industry will be a vital factor in making 1928 a prosperous year for car builders, parts makers, distributors and dealers. Real progress is being made along this line and it must be continued if the automotive industry is to hold the position it has won in competition with other industries for a fair share of the consumer's dollar

hands and not have been under its new management long enough to permit a rejuvenation process to make visible progress.

Study of specific company conditions, as a matter of fact, leaves small doubt that 1928 will witness a marked upturn in the fortunes of several important automobile organizations, while there is little evidence of any decline in the activity of those which have been going forward successfully.

Opinion throughout the industry, both among vehicle manufacturers, parts makers and dealers, leans strongly to the belief that 1928 automotive business will eclipse not only that of 1927 but also that of the record year 1926, when there were 3,929,542 passenger cars and 535,006 motor trucks built. And there are many facts to justify this trend of opinion, when it is realized that 1927 passenger car output fell well below even the semi-depression year of 1924.

While so important a figure as John J. Raskob has predicted a production of 5,000,000 in 1928, and while

his opinion is upheld by several representative automotive men, it is the more common belief that the 1928 total will not reach such high proportions. Communications and talks with a number of important vehicle company executives, however, indicate a rather general idea that the 1928 figure will be around 4,500,000, with a few voicing belief in an even more conservative figure.

Representative dealers, on the other hand, tend to be more conservative in their predictions about 1928. While most retailers and wholesalers are confident that 1928 will go ahead of 1927, they see a number of factors arising which will tend to hold the unit volume advance to moderate proportions, while there is a somewhat general fear that unit profits will drop even further in 1928.

As the Dealers See It

Among these limiting factors which dealers mention are:

1. Used cars are hard to sell and new cars can't be sold without coordinate movement of new cars.
2. Some manufacturers are adding so many accessories as standard equipment and charging dealers' standard prices, that dealer profits on accessory sales are being cut into, thus hurting net profits.
3. Ford competition will be serious in all low-priced cars.
4. Sales costs are rising more every year.

The general opinion among parts and equipment manufacturers seems to be that 1928 will be an excellent year but that competition will be very keen, with individual efficiency and merchandising the outstanding elements in determining success.

The feeling of passenger car executives is pretty well typified by this statement from one of the most prominent men in the industry: "I think next year is going to be a good year. Practically all of the good companies should surpass their shipments of 1927 and also 1926." Another executive, of equal authority in the industry, looks for an output of 4,000,000 cars and trucks in 1928; another sees total output about the same as the 4,464,548 recorded in 1926. Still another writes:

"All indications would point to 1928 being a bit bigger than 1926 and, therefore, a very nice increase over 1927."

An especially interesting slant on the situation is given by the president of one other company who, after stating his belief that 1928 output will be higher than 1927, adds: "About the only new factor that I believe will affect the situation next year will be that manufacturers will not force production as they did, and perhaps watch profits a little closer, all of which will be for our mutual benefit."

That this summary of views is representative of the ideas held by important executives is made clear by the fact that the opinions from which it is made include those of such men as A. R. Erskine, C. W. Nash, H. H. Franklin, Alvan Macauley, F. E. Moskovics, R. E. Gardner, Jr., A. J. Brosseau, Edward S. Jordan and others of similar prominence.

Agreeing in a general way with the views on the total output already expressed, parts and equipment makers are looking at 1928 from some rather interesting angles.

The president of one unit parts company, for example, thinks that "competition in 1928 will be keener than in 1927, when, of course, it was very keen. This element would obviously tend to reduce profits, not only of car manufacturers but also of parts manufacturers." Another accessory company executive, on the other hand,

writes his belief that "car sales, car manufacturers' profits and the profits of component parts makers should all be more favorable in 1928 than in 1927. The fundamental reason is that the country is prosperous and has not been buying cars at a normal rate because of the hesitancy due to style changes, principally those of Ford. With the atmosphere cleared, following the New York show, the industry will spurt to record volume."

From the parts, accessory and service equipment manufacturers' standpoint, the New Year looks particularly bright. The final announcement of the new Ford, which has meant so much easing of tension in all parts of the industry, probably will mean most to those specially interested in the service and maintenance end of the business. Those manufacturers who supply Ford accessories to the replacement trade, of course, will be directly benefited. The fact that Ford dealers will be making real money in 1928, after a period of comparative inactivity, cannot help but reflect favorably in the entire shop equipment field.

The increased, specific attention which is being given to service and maintenance work all along the line, moreover, indicates an unusually good and profitable year for that whole group of parts, accessory and shop equipment concerns which make up so large a part of the total automotive picture.

It is interesting to note that few executives are bothering much about the fact that a new president will be elected in 1928. The bugaboo about presidential election years seems to have been laid away for good, if recent conversations are any guide to basic feeling on this subject. Rarely has the question been raised voluntarily in any talks about the outlook for the 12 months, while only one or two executives out of many score even mentioned election possibilities in their letters commenting on the future.

New Car Stocks Low

Dealer new-car stocks are in an unusually favorable condition as 1928 starts. Reports from dealers for many prominent lines, including Nash, Hudson, Reo, Chrysler, Dodge, Buick and many others, indicate almost uniformly a normal condition as regards new-car stocks. This in itself is a decidedly favorable factor.

Used-car stocks vary. Conditions are very bad in many areas, about the same as usual in others and unusually good in very few places.

"The used-car situation I do not think has improved to any great extent," writes one central Pennsylvania distributor, for example. Only slightly more optimistic is this statement from a big Ohio distributor: "In my opinion, those firms which endeavor to give good value in their used-car departments by reconditioning their cars properly and standing back of them will not suffer much more in 1928 than they have heretofore."

"Worse each year," is a terse comment on used cars from Utah, while one from another section of Ohio sends this statement: "I believe that the used-car situation as a problem has been worse this year than last and will not improve in 1928." And so it runs throughout the reports from dealers and distributors. While the picture they give may be painted in darkened colors than are warranted, there can be no doubt about the fact that the used car must be considered very definitely in any predictions which are to be made about 1928 production and sales.

The advent of the new Ford, while its general effect on the industry is certain to be helpful, will not improve the used-car situation in the opinion of most observers. Ford dealers, for a good while to come at least, will

not have to make over-allowances on old cars in order to sell their new ones and in many cases probably may be able to sell even while refusing to make trades. The dammed up demand for the new Ford, on the other hand, is going to release to the used-car market an unusually large number of cheap cars in the first half of 1928.

Offsetting any tendency toward limiting production which the used-car situation might produce, however, is the constantly increasing activity in automotive export markets. The year 1927 was featured by distinct gains in overseas sales of both vehicles and parts, even while the domestic market was sagging a bit. In the first 10 months of 1927 American automotive manufacturers sold to foreign markets about \$70,000,000 worth of goods in excess of the amount sold in those same markets in the first 10 months of 1926. The total export business in cars, trucks and parts—exclusive of tires and shop equipment—for the first 10 months of 1927 alone reached the astounding total of nearly \$350,000,000, to which several millions more will have been added when the final returns for 12 months are accumulated.

Progress in Foreign Field

Every automotive line has continued to make progress in the foreign field. Exports of passenger cars from the United States and Canada increased from 238,376 for 10 months of 1926 to 276,200 for the first 10 months of 1927. For the same period, truck exports went up from 61,244 to 102,880 and parts exports shot from \$76,368,993 in 1926 to \$88,583,362. There is every evidence that the continued stabilization of world affairs which is taking place will result in still further advances in export sales during 1928.

The export progress shown by these figures of the United States and Canadian exports, too, is only a part of the whole. To be considered also are the cars sold by American companies but assembled in foreign plants under the control of American producers. The activity there also has increased in the last year, the total vehicles produced by the foreign assembly plants having been 147,046 for the first 10 months of 1926 as compared with 178,515 in the first 10 months of 1927.

This form of handling export sales is definitely on the increase. Plants already in operation doubtless will step up their output next year, while several new foreign assembly plants undoubtedly will get into operation for the first time during 1928.

To estimate just how much plant expansion there will be in the automotive industry next year is difficult. It is certain that there will be many plants revamped, many new machinery layouts made, much new equipment purchased. The period of competition in which the parts as well as the vehicle makers find themselves is sure to result in even more intensive investigation of ways and means of cutting production costs, in study of the latest methods of doing old operations and in continued revision of factories and plants to meet changing requirements.

Despite the presence of more than sufficient capacity at present to take care of any probable demand for automotive products in 1928, there will undoubtedly be a number of new plants and additions erected during the year 1928. The swing of business from one company to another will continue next year as it has in the past. As these swings of the pendulum take place, new equipment has to be procured and utilized. Automotive building, it must be remembered, is controlled not merely by the theoretical capacity of the industry, as compared to the probable demand, but by the actual

capacity of a given plant in relation to the number of sales that a given company finds itself able to make. This holds true in every branch of the automotive field—and in all other industries, for that matter.

Car prices seem almost certain to remain reasonably stable throughout the 1928 spring selling season. This in itself will be a big factor in keeping the industry on an even keel and in making 1928 a prosperous as well as a productive year. Some are of the opinion that there is a possibility of a slightly downward trend in prices in the lower-priced classes, due to the new values to be found in the Model A Fords at little more than the price of the previous Model T. While definite statements on a matter of this kind are likely to be misleading, it is fair to say that there is little evidence to support the idea that any of the other low-priced makers are going to enter into any kind of definite price competition with Ford.

There has been a definite feeling growing in the industry for some time that price is no longer as powerful a sales weapon as it once was; very strong efforts to focus sales appeal on other factors have been taking effect. Consequently, there is every reason to believe that no serious price readjustments are going to be made in the industry as a whole.

Prices in practically all automotive lines have been down very close to bed-rock for a long time. The industry is far more likely to concentrate on ways and means of eliminating a condition of profitless prosperity than it is to further handicap itself with price declines.

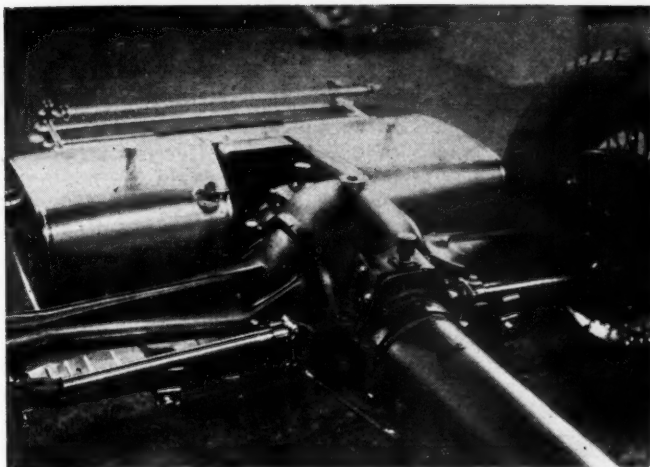
While keen competition undoubtedly will tend to urge automotive prices downward, every other factor in the situation, from the standpoint of the car maker, the parts maker and the dealer, cries for a maintenance of price levels wherever possible, and the establishment or maintenance of reasonable profits.

The necessity for concentration on the development of fair profit margins in every branch of the industry will be emphasized in 1928 more than ever before. With the automotive industry striving with other large industries for a greater share of the consumers' dollar, the imperative need for strength and stability in every link of the automotive chain becomes apparent.

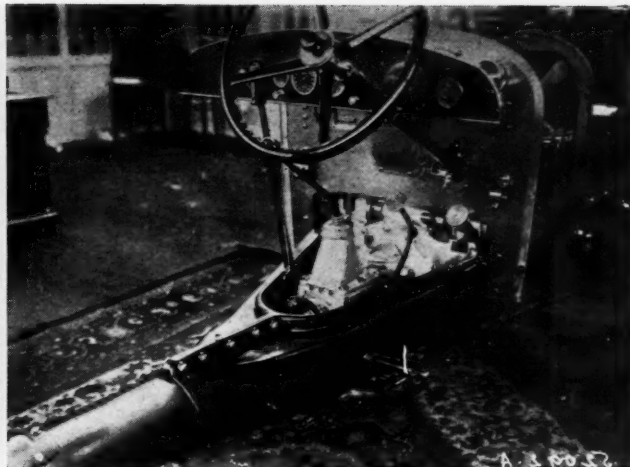
Practical Cooperation Needed

A greater degree of understanding and practical cooperation between the different branches of the industry in 1928 will be another vital factor in making the year a prosperous one for all concerned. The dealer, struggling for a very meager net profit in many instances often has the feeling that it is the factory which is causing his grief; that the factory is making big profits while he bears the burden. To some extent he may be right in individual instances, but any close investigation of profit trends among manufacturers, as pointed out previously, will show that, in the manufacturing as well as in the distributing field, net incomes have not been moving ahead as they should.

The manufacturer, on the other hand, who is seeking a permanent place in the automotive sun, is being made by economic and competitive conditions to realize that he cannot overload dealers with cars, or otherwise provide unfair conditions for dealers, and still have a permanently stable and loyal retail organization. There is still much to be done in the way of bettering relationship between manufacturers and dealers, between manufacturers and parts suppliers and between manufacturers and factory equipment makers. The progress which is made along this line, many executives feel, will determine to a large extent the final profits of the automotive industry for 1928.



Austro-Daimler rear axle construction



Front end of Austro-Daimler chassis

Austro-Daimler Exhibits *Frameless* *Six* at Brussels Show

Car has three point suspension chassis. Nagant introduces four-cylinder double piston two-stroke supercharged power unit. Closed bodies predominate. Ford Model A featured.

By W. F. Bradley

THE appearance of the new Ford was the outstanding feature of the annual Brussels show, which opened Dec. 3 in the Palais du Cinquantenaire. The car had been revealed in London the day before, but Brussels marked its debut on the Continent of Europe.

The Brussels exhibition was the twenty-first of an annual series and united 875 exhibitors. There were 80 makers in the automobile section, France being represented by 42, America by 20, Belgium by 9, Italy by seven and Germany and Austria by one each. England was the only manufacturing country not taking part in the show.

Comparatively few cars were on exhibition which had not previously been seen at either Paris or London. Imperia brought out a six-cylinder model of its sleeve valve engine, of the same general design and the same bore and stroke (66 by 80 millimeters), as the existing four-cylinder. Nagant exhibited an engine and transmission unit with a four-cylinder double piston two-stroke super-charged engine, the blower of which is built in as a part of the unit. The cylinder bores form a V with a small angle and have a common combustion chamber. Through ports uncovered by the pistons, one cylinder admits the fresh charge and the companion cylinder releases the exhaust gases. One piston having a lead over the other, a lead can be given to the exhaust opening and the fresh charge does not tend to pass out through the exhaust port. It is claimed that this engine will throttle down perfectly to 300 r.p.m.

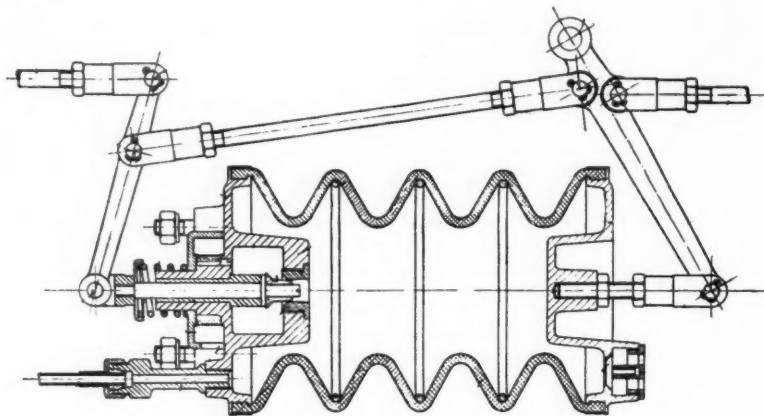
Among the models exhibited for the first time on the Continent was a six-cylinder Austro-Daimler with

3 by 4.33 in. cylinders, having a three point suspended chassis. A normal type of front axle, semi-elliptic springs and the usual side rails are used at the forward end. Immediately behind the hood, however, these side rails are cut short and have riveted to them the open arms of a torque tube united to the rear axle construction. There is a tubular extension beyond the differential housing, to which the gasoline tank is attached. The rear wheels being independent, the chassis is carried on three points. The body is supported at three points.

Originality in Bodies

Much originality was shown in the body exhibits. The open car is obviously disappearing, except as a sporting proposition, its place being taken by the sedan. No Belgian maker is producing all-metal bodies, and the movement toward fabric leather is remarkably strong. The Weymann flexible type employing a skeleton frame and the wood and metal body with fabric covering were about equally represented. The two biggest makers, Minerva and F.N., are almost exclusively on fabric leather construction. The practice of cellulose painting the fabric leather, now common in France, is not employed in Belgium, but there is a general tendency to make use of two tints of leather, one up to the waist line and another above this line, with a molding over the joint. The valance between body and running board is being eliminated by lowering the door to the level of the running board. On sports models it is common to abolish the running board, but this involves the fitting of special front fenders to protect the body from mud splashing. On a large number of sedan bodies the

windshield is now fixed, the windows above the forward doors being relied on to admit air. A luggage trunk is invariably supplied as an essential part of the body, being finished in the same colors, or covered with the same material, and either mounted on a permanent platform, or built in with the body.



De Monge rubber bellows vacuum brake

In the truck section Belgian makers were in a majority, for American firms have barely touched this field and French and Italian representation was meager. Auto Traction, which is the truck section of the Minerva Company, Pipe, Bovy, Miesse, Dasse, Brossel, are the Belgian makers, and all of these, with the exception of Minerva, have during the past few years abandoned passenger car construction in order to devote themselves exclusively to commercial vehicles.

Charcoal gas trucks are being developed for colonial use, particularly in the Congo, but are finding a very limited application in Belgium. In all cases the engines are now specially designed for running on charcoal gas, having a much higher compression ratio, bigger valves and ports, and in some cases special ignition devices. Minerva and Pipe are paying special attention to this class of Colonial truck, while the Mateco is a concern producing only charcoal gas trucks.

Parlor coaches with six and eight-cylinder engines constitute the type to which greatest attention is being paid. In all Belgian cities the electric street car is so highly developed that it is practically impossible for the gasoline bus to compete with it. For long distance service, however, there is an important field of usefulness for the coach, and makers are seeking to develop this market. Bovy has brought out a new six-cylinder coach chassis, having an engine in two blocks of three 3.62 by 4.72 in. cylinders, with intake valves over the exhaust, the former being operated by push rods and rockers. The four-speed transmission is mounted separately from the engine on two cross frame members and the drive taken through an open propeller shaft to a double reduction rear axle.

The Dasse six-cylinder coach is an L-head type having battery ignition; it constitutes a unit with the clutch and gearbox and has a drop chassis and fabric universal joints to an underslung worm rear axle. The only six-wheeler of Belgian construction is a Miesse, equipped with a straight eight, 3.15 by 5.12 in. overhead valve engine. The driver is seated alongside the engine and the steering gear is completely forward by the side of the radiator. Power is transmitted from the unit powerplant through a two-part open propeller shaft with metal universal joints, this shaft being carried centrally under an X cross member uniting the side

rails. The two axles are of the underslung worm type united by a metal-universal-joint shaft and attached by inverted semi-elliptic springs, one spring being anchored above the other below the axle housing. Goodyear low pressure tires are fitted. With a wheelbase of 212 in. and a body length of 287 in., the Miesse coach carries a 40-passenger saloon body.

Auto Traction has one drop frame coach chassis equipped with a four-cylinder 3.94 by 5.52 in. Knight-type engine. The rear axle is a double reduction type and tire equipment comprises 38 by 9 in. Goodyears (duals on the rear). Solid tires seem to have been entirely given up in Belgium, even the biggest trucks being mounted on pneumatics.

The Dewandre vacuum servo brake, which originated in Belgium, is very extensively employed on cars and trucks in that country. All vehicles exhibited had four-wheel brake equipment. A new vacuum servo brake has been produced by De Monge, of Liege. It makes use of rubber bellows in place of the usual metal cylinder and piston. The two ends of the bellows, which are of circular section, are closed by metal plates, the rubber being attached to them by means of a collar. One of the plates receives a valve which is opened by means of the brake pedal, thereby putting the bellows in communication with the intake manifold of the engine. The other plate is connected up to the brake levers and control rods. It is claimed that the rubber is as durable as metal, and the bellows is said to have the advantages that it dispenses with the need of lubrication, makes even partial seizure impossible, is self-guiding and returns quickly to the "off" position.

Eliminating Depressions Caused by Spot Welding

IN the discussion of the paper on Automobile Welding by W. C. Happ, chief engineer, department of methods and standards, Studebaker Corp., presented at the fall meeting of the American Welding Society in Detroit, the subject of trouble from depressions in body panels secured by the spot welding process came up. The author of the paper called upon Mr. Roush of the Studebaker Corp., who, he said, had gone into the subject very thoroughly, to answer the question as to how such depressions were eliminated.

Mr. Roush said that when his company first experienced trouble from this source, they took a little drill or a file and carefully cleaned all the corrosion from the spots, then cleaned them further with acid and soldered them, which was quite an expensive operation.

After trying various schemes, Mr. Roush said, he decided upon the use of an electrode from 1¼ to 1½ in. long, ⅞-in. in diameter and perfectly flat. The center was cupped out to a radius of ½-in. from 0.005 to 0.006 in. deep. With this form of electrode point it is necessary to slightly increase the spring pressure of the welder. The upper electrode, which is small in cross section, then comes down on the metal, heats it and forces it into the depression on the lower electrode. The weld is affected and the lower surface remains practically smooth, one or two passes of a buffing wheel or a disk grinder giving a nice finish.

Just Among Ourselves

What is the Future of the "Garrett Genius"?

WE haven't heard of any automotive men yet involved in the interesting argument about the future of the "garret genius" which started a short time ago when Maurice Holland of the National Research Council propounded the theory that the independent inventor today has little chance against the formidable research organizations of modern industry. We would be interested in hearing what some automotive research authorities think about it. Our own thought is that the chance of the independent inventor depends very strongly on the sort of thing that he is working with.

Opportunities Not All Gone

W. A. KINNAN, first assistant patent commissioner, disagreeing with Holland's statement, cites the vacuum cleaner as one modern example of the effectiveness of the work of an independent inventor. Ideas of this general character seem to us to offer just about as good possibilities for the independent in the future as in the past. The vacuum cleaner, it would seem, embodied chiefly a new application of certain physical and mechanical principles already pretty well understood. The independent worker is probably more likely to think of such things, as a matter of fact, than is the trained research worker in a highly organized industrial organization. The independent frequently tends to start his thinking from the non-technical standpoint of needed services or desirable simplifications of ways of doing things from the viewpoint of the user. He is likely to think first in terms of practical applications and then later in terms of technique and theory. Often, because of this approach, he may furnish the germ of an idea which, with his own scien-

tific knowledge, he is entirely incapable of working out in a practical commercial or technical form.

* * *

Professional Mind May be Too Skeptical

MOST men working in regular industrial research activities, on the other hand, are selected primarily because of their known abilities along sound, established scientific lines. Their attitude of mind must necessarily be one of doubt

But on the average, it would seem, there is plenty of scope for both independent and organization workers, with a twilight zone in which cooperation is essential to the success of either. It is not to be denied that certain types of inventive work today require a detailed knowledge and understanding of so many different kinds of scientific experience that the coordinated effort of a group of individual experts through large scale industrial research organizations is absolutely essential to accomplishment.

* * *

Keeping Track of the Repair Bills

REPAIR bills usually are thought of as nothing to bring into the limelight so far as the retail selling is concerned. We heard the other day, however, about a truck branch manager who has his service department keep as accurate a record as possible of all repairs and replacement parts going into his customers' trucks. His sales manager constantly is making analyses of these records for each individual fleet operation and the data is used effectively in keeping the customers sold on the trucks which they already have bought and in selling them new trucks when the time for such action arrives. Probably the idea is much more applicable to truck selling, where fleet operations and cost systems play a far more important part than in passenger car activities. Where a car dealer has got down to really selling service, just as he sells new and used cars, however, some such running analysis on a certain number of typical jobs might furnish good sales material. If the figures turned out to be so large as to look unfavorable for sales purposes, they might serve as a good guide to improvement of service facilities or methods.—N.G.S.



and skepticism in connection with part of their work; in order to be sound there must be a good grounding of skepticism in the scientific mind. That in itself, together with that very knowledge of technical laws which is necessary to the organization worker, tend to provide certain inhibitions to radical inventive thought which may not be present in the minds of the independent experimenter or investigator.

* * *

Plenty of Work in Both Fields

SOME men with thoroughly sound technical understanding, of course, have also unusually free, roving, speculative minds as regards inventive possibilities; such a combination is what permits us our Edisons, our Pupins and our Ketterings.

Automotive History Filled



By R. L. Cusick

AESOP was right. Unity between brothers gives strength. Nowhere is this better illustrated than in automotive history.

Not in literature, science, art, finance or politics, nor in any other industry we know of, have brothers climbed to fame and fortune together in such numbers as in the automotive industry.

True, if we think hard enough we can name a few combinations of brothers who have gained national and international fame in other fields by applying the moral of Aesop's fable—the Rothschilds, the Guggenheims and the Van Sweringens, for example—but in automotive pursuits it seems, singularly enough, that it has always been common practice for brothers to work in double harness.

Since the earliest days of the "horseless carriage" brothers have played an important part in automotive development. As partners, co-workers and associates they have served the industry as engineers, inventors, organizers, vehicle manufacturers and parts makers. It is impossible to write any kind of an automobile history without mentioning at the very outset the Dur-yees, the Packards, the Appersons, the Whites, the Stanleys and half a dozen other brother teams. Inci-

Have played important part in industry's development since earliest days of "horseless carriage." Fishers take prize for greatest number in one group.



dentally, the Stanleys, F. E. and F. O., were not only brothers but they were twins.

And coming right down to the present time, such a history would be woefully incomplete did it fail to make prominent reference to the Fishers, the Grahams, the Stranahans, the Widmans, the Jewetts and a long list of others.

It is no trouble at all to complete a list of 30 or 35 different sets of brothers who have been, or now are, famous leaders in the automotive industry. Let's qualify this by saying in the American automotive industry, because Europe has a separate list of its own which is quite imposing; it appears that the particular virus which is responsible for causing brothers to team together in automotive enterprises is very cosmopolitan and operates as effectively there as here.

Particularly prominent in the present era. and merit-

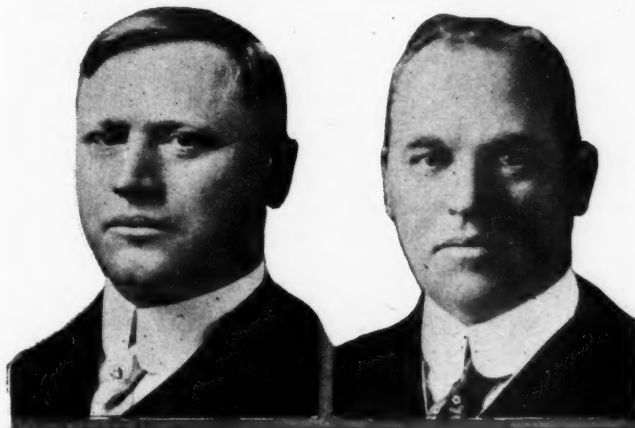
With Names of Famous Brothers

ing special mention because of their ability to win any prize which might be offered for the largest number in one group, are the Fisher brothers of Fisher Body fame. There are seven of them—Fred J., Charles T., Lawrence P., William A., Edward F., Alfred J. and Howard A.

From Fred down to Howard, the seven Fishers have stuck together in business through thick and thin, always keeping their eggs in the same family basket, so to speak, and the result is seen today in the Fisher Body Corp., one of the most valuable of all General Motors properties and the vehicle which carried the brothers to the peak of wealth and industrial power.

Four of the brothers, Fred, Charles, Lawrence and William, are now directors of General Motors. Fred, Lawrence and William are also vice-presidents and Lawrence, in addition, is president of the Cadillac Motor Car Co. William, besides his other duties, serves as president of the Fisher Body Corp. Edward, Alfred and Howard are all prominently affiliated with the management of Fisher Body.

The joint fortune of the Fishers is immense and they handle this together just as they have handled the rest of their business affairs. Fisher & Co. has been set up as a common repository for their funds and is the source upon which they draw for outside investments, such as the recent purchase of a heavy interest in Baldwin Locomotive and the erection of a gigantic office



John (left) and Horace Dodge



*The Seven
Fisher
Brothers*

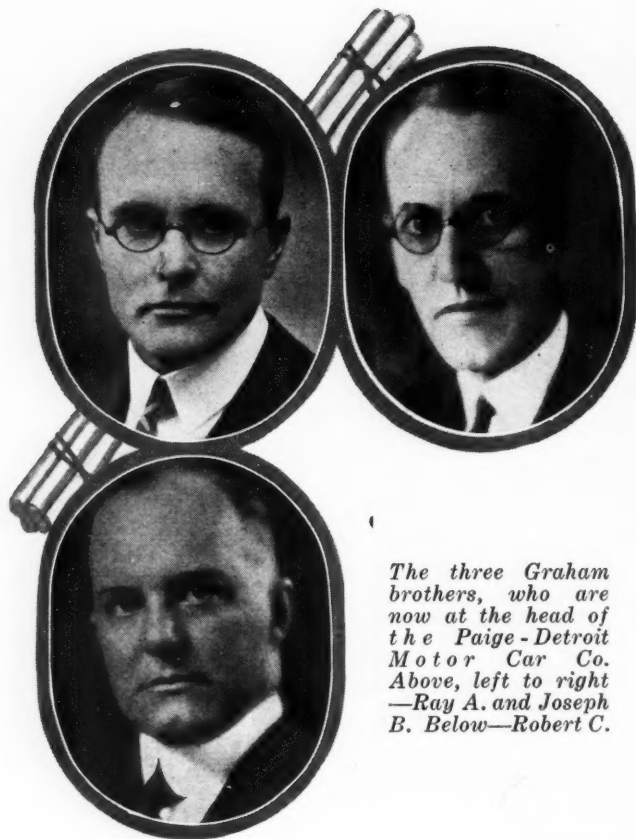
Top, left to right—Lawrence P., Edward and William A.
Center—Alfred J. (left) and Howard A.
Bottom, left to right—Charles T. and Fred J.

building which has been started in Detroit.

The Fishers were born in Norwalk, Ohio, where their father, Lawrence, was building wagons and carriages on a small scale with his brother Andrew. As the young Fishers grew up they went into their father's shop to learn the trade. At 25 years of age, Fred, the eldest, went to Detroit, where an uncle, Albert Fisher, also had a small carriage-building business. But before long he was with the C. R. Wilson Carriage Co., which at that time was the largest carriage body concern in the world. He started in the drafting room but climbed rapidly and soon became manager of operations. In the meantime his brother, Charles T., had joined him.

Organized Fisher Body Co.

In 1908 Fred and Charles, with their Uncle Albert, went into business for themselves. They organized with Fisher Body Co. with a capital of \$50,000 and the uncle was elected president. He withdrew a short time later, however, when the boys took over his interest. Business began to boom and rapid expansion was imperative, but it was difficult to raise capital to take care of the fast growth. At this stage Aaron and Louis Mendelssohn (brothers) became interested in the plucky fight the young men were waging and furnished the financial aid which ultimately put the enterprise "over the top."



The three Graham brothers, who are now at the head of the Paige-Detroit Motor Car Co. Above, left to right—Ray A. and Joseph B. Below—Robert C.

The Fisher Body Corp. came under the control of General Motors in November, 1919. Among the chief assets which General Motors acquired by the deal was the Fisher brothers themselves. We might add, as a concluding bit of information, that Fred, the oldest, is 50, and Howard, the youngest, 26.

Another combination that is very much in the public eye at this time is composed of the three Graham brothers, Joseph B., Robert C. and Ray A., who made a tremendous success of the Graham truck, sold out to Dodge Bros., Inc., and are now at the helm of the Paige-Detroit Motor Car Co.

Started in Glass Business

The Grahams made their start in the glass business. Joseph B., who is the inventor of several glass-making machines, organized the Graham Glass Co. in 1900. Later on his brothers joined him and were made officers of the company. In 1916 they branched out into the tractor industry. It was a short step from there to the manufacture of trucks. The Graham truck, using the Dodge engine, was an immediate success. There was such a close business relationship between Graham Brothers and Dodge Brothers that Dillon, Read & Co., the bankers, after acquiring the latter, in 1925, also took over the former and made it a division of the reorganized Dodge Brothers, Inc.

The three Grahams went along, Joseph B. as vice-president in charge of manufacturing of Dodge Brothers, Inc., Robert C. as vice-president and general sales manager, and Ray A. as general manager. They have since severed their relations with Dodge, and bought out Paige after forming the Graham Brothers Corp., an investment company similar in set-up and purpose to Fisher & Co.

It seems logical at this juncture to bring in the Dodge brothers, John F. and Horace E. Few names in the history of the industry have been more widely ad-

vertised than theirs and few men ever achieved such outstanding success in so short a time.

The Dodges were born in Niles, Mich., in the middle '60s. Their father was a machinist and ironworker and the boys became machinists. They worked together at their trade at various places and finally located in Detroit. There they became owners of a modest machine shop and made the acquaintance of Henry Ford when the latter was working on his idea of a low-priced, quantity-production car. They acquired stock in the Ford company by giving Ford the use of their production facilities. That was in 1901.

With Ford Until 1914

The brothers remained with the Ford company until 1914. The rise of the company in the meantime had earned them a large fortune. When they withdrew it was to organize a company of their own and start the manufacture of the Dodge car, which was in a higher price class than the Ford. They were eminently successful from the beginning. During the first few years that they built their own car they continued to hold their stock interest in the Ford company. This was disposed of, however, in 1919.

The Dodges both died suddenly within a few months of each other in 1920. The company, managed by their estates, continued to prosper. Its sale in 1925 to Dillon, Read & Co., bankers, for \$146,000,000 cash was the biggest industrial transaction of its kind in history.

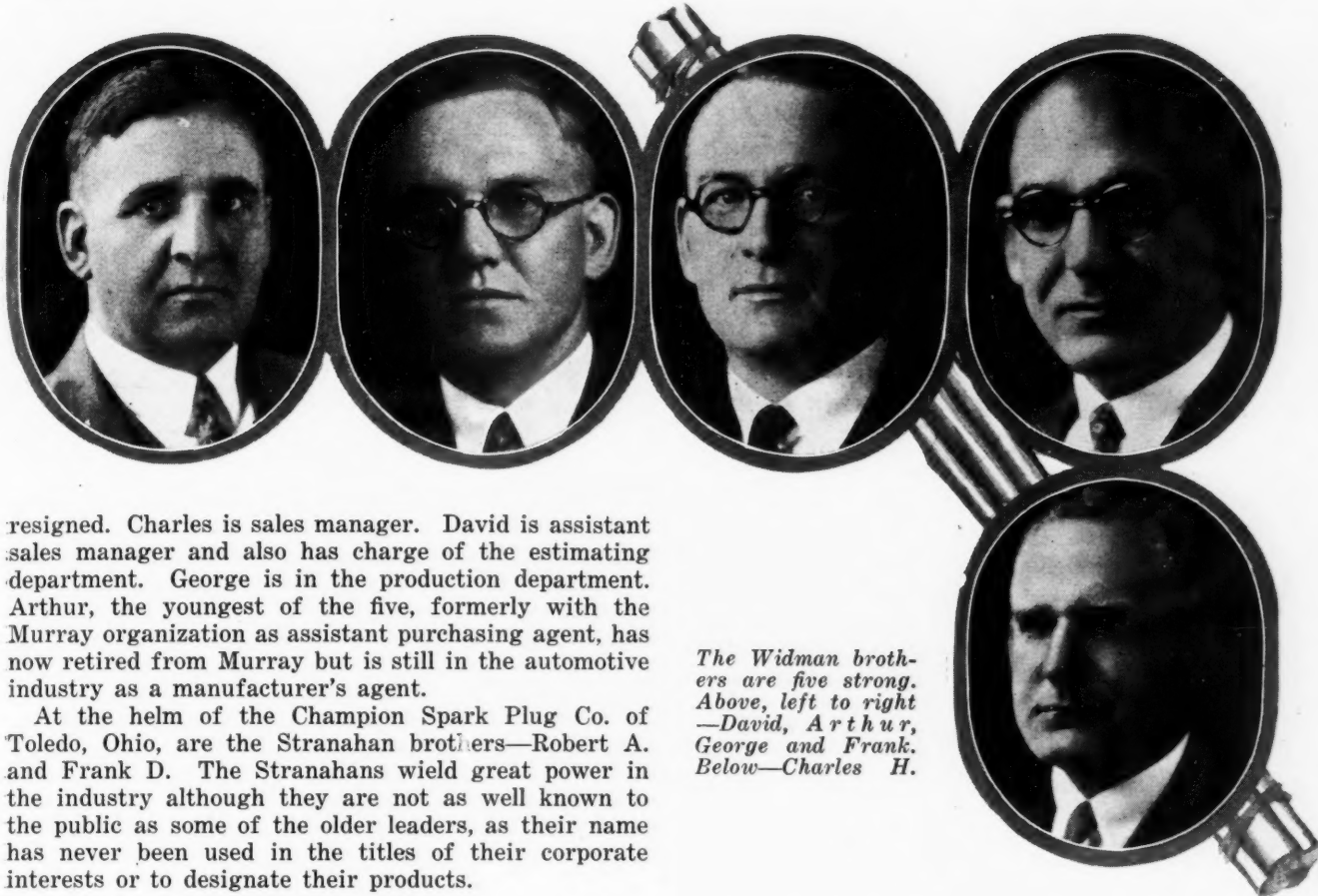
A name that one hears frequently in connection with automotive affairs around Detroit is Widman. One reason for the frequent mention is that there are five Widmans. They, too, are brothers and for a number of years they worked together in the management of J. C. Widman & Co. J. C. Widman was their father. The brothers are Frank E., Charles H., David, George and Arthur.

In 1900, Frank, Charles and David joined their father in organizing J. C. Widman & Co. for the manufacture of furniture, store fixtures and mirrors. Upon becoming old enough the other brothers entered the business. During the war period the company turned to the manufacture of airplane parts and cold water glue. In 1919 it began to build automobile bodies and soon became an important factor in the body industry. In December, 1925, it merged with the Murray Body Corp., now the Murray Corp. of America.

After the consolidation Frank Widman carried on research work for the Murray Corp., but has since



The Stranahan brothers, who control the affairs of the Champion Spark Plug Co.—Frank D. (at left) and Robert A.



resigned. Charles is sales manager. David is assistant sales manager and also has charge of the estimating department. George is in the production department. Arthur, the youngest of the five, formerly with the Murray organization as assistant purchasing agent, has now retired from Murray but is still in the automotive industry as a manufacturer's agent.

At the helm of the Champion Spark Plug Co. of Toledo, Ohio, are the Stranahan brothers—Robert A. and Frank D. The Stranahans wield great power in the industry although they are not as well known to the public as some of the older leaders, as their name has never been used in the titles of their corporate interests or to designate their products.

Made Beginning in Boston

Frank was in the automobile business in Boston in the early days. He found it necessary to import most of the accessories he handled and finally put in a wholesale accessory department. While Frank was developing his business Robert was in Harvard. The latter, after graduating, went to work in his brother's stockroom. After familiarizing himself with the details of the line he went on the road as a salesman. He became especially interested in spark plugs and soon he and his brother Frank embarked upon the manufacture of Champion plugs in Boston. They discovered that they were too far from the center of the industry and consequently moved their infant business to Toledo, where it grew rapidly. Robert A. is president.

There are three White brothers whose roots go deep into the history of the automotive industry. Windsor T., Rollin H. and Walter C. all got into the manufacture of automobiles in 1900, when their father, Thomas H. White, was running the White Sewing Machine Co. The first car was a steamer and it was designed by Rollin. Windsor took charge of sales and Walter handled the executive details of the business. In 1906 The White Co. was formed. A White gasoline car was introduced in 1910. In 1915 the present White Motor Co. was organized. Windsor and Walter are still identified with the company, the former as a director and the latter as president. Rollin withdrew in 1914, organized the Cleveland Motor Plow Co. in 1917 and introduced the Rollin car in 1923.

Harry M. Jewett had two brothers associated with him in the management of the Paige-Detroit Motor Car Co., which, as previously mentioned, is now owned by the Grahams. Harry Jewett helped to organize the company and later became its president. His brother Frederick L. was first vice-president and another

The Widman brothers are five strong. Above, left to right—David, Arthur, George and Frank. Below—Charles H.

brother, Edward H., was a director of the company.

The Studebaker Corp. of America is an outgrowth of the carriage and wagon business founded by five brothers—Henry, Clement, John M., Peter Everst and Jacob Franklin Studebaker. Four of these brothers died before the company which they created entered the automotive field, but John M. lived to see the transition and to serve as first president of the Studebaker Corp. He afterwards became chairman of the board, and in 1915 the position of honorary president was created by the directors for him. He died in 1917.

The Kissel Motor Car Co. was organized in 1906 by four brothers who still control its affairs. George A. Kissel is president and general manager, O. P. and A. P. are vice-presidents and W. L. is secretary and treasurer.

The Marmon Motor Car Co. of Indianapolis is the development of the Marmon brothers, Walter C., who is chairman of the board, and Howard C., vice-president.

There are two Duesenbergs—Fred and August. Working together, they built the first straight-eight stock car in America. Fred has since become famous as one of the foremost designers of high-grade stock cars and racing cars in the world. He and August still work together in the engineering department of the Duesenberg Motors Co.

Two other well known engineers in the industry are the Crawford brothers, Charles S. and James M. The former is chief engineer of the Stutz Motor Car Co. of America, Inc. The latter was until recently chief engineer of Auburn and is now in the engineering department of Chevrolet.

This by no means completes the list. It has been impossible in the space allotted here to include all the brothers who have made automotive history. There are still many others, mention of whom will be made in a second article in next week's issue.

Diesel Engine *Ignition Lag* Largely Influenced by Preheating

Density of air also a factor. Development of high-speed ignition-compression engine for automotive service continues in Europe. Several new models.

By P. M. Heldt

ALTHOUGH many engineers in this country profess to be unable to see a future for the high-speed ignition-compression engine in automotive work, because of the comparatively small proportion which fuel costs bear to total costs and the ease with which heavy fuels can now be converted into lighter ones by the cracking process, in Europe the development of high speed oil engines continues and this engine occupies a relatively important place in foreign current technical literature.

As is natural in this early stage of the development, a good deal of the work that is being done is of a scientific character, relating to the principles of mechanical atomization of heavy fuels and to the combustion of fuels thus atomized. In this article are discussed some of the latest developments along this line, based on recent European publications.

In an investigation covering the nature of the combustion in Diesel engines, Neumann (*Zeitschrift des Vereines Deutscher Ingenieure*, Vol. 70, p. 1071) found that with solid injection, when gas oil is injected into air which has been previously heated by compression to from 750 to 1200 deg. Fahr., it does not ignite immediately but with a lag, the duration of which depends upon the conditions of the experiment but which is equal to from 5 to 8 times the duration of the combustion itself. The lag is largely influenced by the preheating and the density of the air. In a test bomb containing still air under 15 atmospheres pressure and at 707 deg. Fahr., the combustion of gas oil injected began only after 0.115 second, whereas the time of combustion—as measured by the period elapsed between the time the pressure began to rise and the time the maximum pressure was reached—was only 0.020 second. The maximum pressure attained in this case was 30.7 atmospheres. On Deutz, Koerting and Junkers engines ignition lags of 0.0181, 0.00935 and 0.00486 second were measured.

From test results the conclusion may be drawn that during the lag of 0.018 second only 0.1 per cent of the fuel vaporizes, hence ignition is not dependent on prior vaporization. However, the rapid increase of the mean heat transmission coefficient with air temperature must be ascribed entirely to the physical phenomena of heat conduction, although it is also promoted by the chemical phenomena up to the point of ignition, particularly the growing velocity of reaction.

The mean heat transfer coefficient in the case of heat flow from air to ordinary bodies amounts to only from 0.8 to 2 B. T. U. per square foot per hour per

degree Fahrenheit, whereas on the injection of gas oil at 122 deg. Fahr., into still air at 8 atm. pressure and 655 deg. Fahr., there is an ignition lag of 0.113 second. The heat required for ignition is 129 B. T. U. p. lb. which with an ignition temperature of 477 deg. Fahr. corresponds to a heat transfer coefficient of 46 B. T. U. per square foot per hour per degree Fahrenheit. The heat transfer coefficient therefore is more

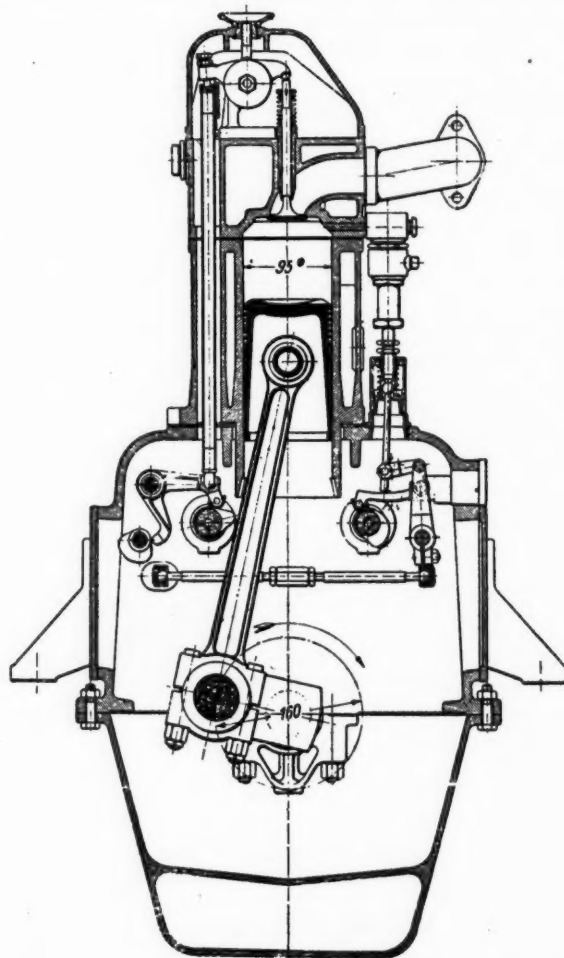


Fig. 1. Cross section of Dorner truck-type Diesel engine

than 20 times greater than ordinarily.

The diameter of the fuel globules after injection is about 0.01 mm. (0.0004 in.) and such a globule contains

about, 1,430,000,000 molecules. Turbulence is of great influence on the combustion, but the heat transfer from air to fuel controls the ignition. The lag in the ignition measured by Neumann with solid injection into heated air varied between 0.00486 and 0.0181 second with three engines, whereas it was between 0.01 and 0.6 second with the bomb.

Experiments on a four-cylinder Dorner Diesel engine were reported on at a meeting of the Verein Deutscher Ingenieure devoted entirely to internal combustion engine problems. This engine is being built by the Railroad Signal Works Max Judel, Stahmer, Bruchsal, Inc. It has a bore of 3.73 and a stroke of 6.30 in. and develops 35 hp.

This engine resembles the conventional truck engine in general form and operates on the solid injection principle. There is a fuel pump on each cylinder which feeds the cylinder directly, thus doing away with pipe connections. Control of the fuel feed is effected by changing the pump stroke. The place of the suction valve is taken by ports in the pump barrel through which the fuel flows when they are uncovered by the pump plunger. The results of tests under constant and variable speed are given in the following table:

Constant speed, variable load..	1	2	3	4
Speed in r.p.m.	976	1050	1064	1053
Net output in hp.	34.5	20.8	10.5	0.50
Load factor	1.15	0.694	0.352	0.017
B. M. E. P., lb. p. sq. in.	100	56	28	0.13
Spec. fuel consumption, lb. p. hp.-hr.	0.46	0.475	0.600	7.90
Thermal efficiency, per cent.	30	29	23	1.7
Variable speed	1	2	3	4
Speed in r.p.m.	1091	887	721	471
Net output in hp.	28.7	30	26.1	16.7
B. M. E. P., lb. p. sq. in.	74	95.5	102	100
Torque in lb.-ft.	135.5	174.5	186.5	183
Spec. fuel consumption, lb. p. hp.-hr.	0.445	0.443	0.485	0.505
Thermal efficiency, per cent.	30.3	30.4	28.6	27.4

From these results the conclusion is drawn that, provided the fuel is properly atomized, the speed of transformation of the chemical energy of heavy oils is sufficient even at high engine speeds and that in this respect the lighter petroleum fuels have no advantage over the heavier ones. It is further concluded that the limit to the power which can be obtained from a given piston displacement is determined not by the speed of combustion but by the speed at which the cylinders can be reasonably filled with air without the use of a supercharger or similar device. The validity of this conclusion may be questioned, however, since there is no reason why the volumetric efficiency should fall off more rapidly in Diesel than in carburetor-type engines; in fact, it should fall off less rapidly in the former, because the engine does not have to draw the air through a carburetor throat, and, besides, the air is not mixed with fuel, which has been shown to have the effect of slightly decreasing the pressure recovery in a carburetor. That is to say, in a carburetor-type engine, under otherwise equal operating conditions, the gaseous pressure at the downstream end of the venturi

will be somewhat higher when no fuel is injected than when it is.

An important advantage of the high-speed Diesel engine compared with the carburetor-type is said to be that the former is much less sensitive to an excess of air. During the tests on the Dorner engine the exhaust was clear, from idling to overload, which is an indication that combustion is complete if only there is an excess of air, regardless of whether there is a small or a large excess. The formation of the combustible mixture is entirely independent of the speed and requires no manipulations of any sort to adapt the formation of the mixture and the combustion to the variable operating conditions.

Bellem Fuel Pump

L. H. L. Bellem, a French engineer, who some 10 years ago brought out a kerosene-burning engine of the carburetor type in which very energetic atomization of the fuel was assured by keeping the inlet valve closed until the inlet stroke was about half completed, has recently turned his attention to fuel injection engines and has patented the fuel pump illustrated in section in Fig. 2. The object seems to have been to do away with the suction valve, which is often a cause of trouble in pumps of this type.

The peculiarity of the pump resides in the fact that the cylinder, instead of being fixed relative to the housing, is capable of motion within limits. The piston *B* receives its motion from a crank through a Scotch yoke, and during the first part of its down stroke carries along the cylinder *A*. At the certain point of the stroke the cylinder is prevented from further downward motion by the split sleeve *D* within it, which grips the pump piston. The piston, continuing its motion, draws the cylinder full of fuel, which enters at *C* and fills the entire housing.

During the return or upward stroke the piston at first carries along the cylinder, until the latter ends up against the conical seat *E* in the head of the pump. During the remainder of the up-stroke the piston forces fuel from the cylinder through the delivery

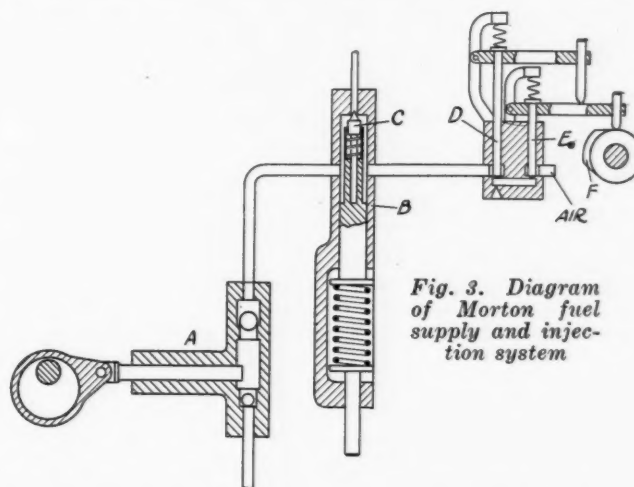


Fig. 3. Diagram of Morton fuel supply and injection system

valve *F*. It is plain that the amount of fuel discharged per stroke depends upon the position of the sleeve *D*.

One form of small Diesel engine that has met with considerable favor, especially in marine work, is a two-cylinder, two-stroke engine, which gives two impulses per revolution of the crankshaft and therefore a fairly uniform torque. This is the form of the Morton Diesel engine, which is being built at 8 Rue Cannebiere, Paris. The cylinders have a bore of 3.94 in. (100 mm.) while

the piston stroke is 6.30 in. (160 mm.) and the engine is said to develop 35 hp. at 1500 r.p.m., its weight being 770 lb. or 22 lb. per hp., which is only little more than the weight of conventional truck engines. The fuel consumption is given as 0.485 lb. per hp.-hr. when Diesel engine oil is used. However, the engine may be operated also on crude vegetable and animal oils, and even on lubricating oil, without any adjustment. It is said to be substantially as flexible as a gasoline engine.

The chief characteristic of the Morton engine is its method of fuel supply, which is illustrated diagram-

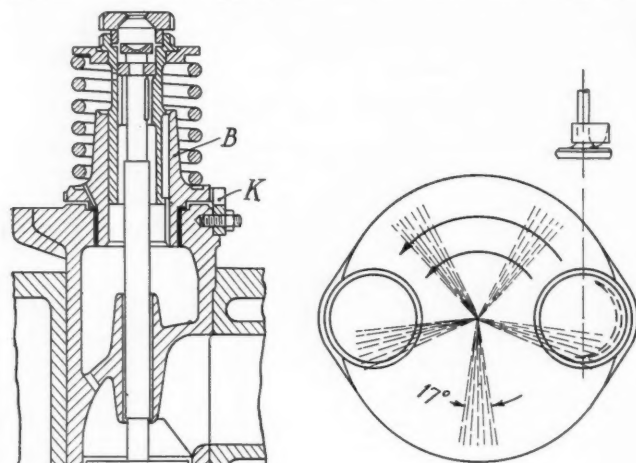


Fig. 4. Hesselman combustion chamber and fuel injector

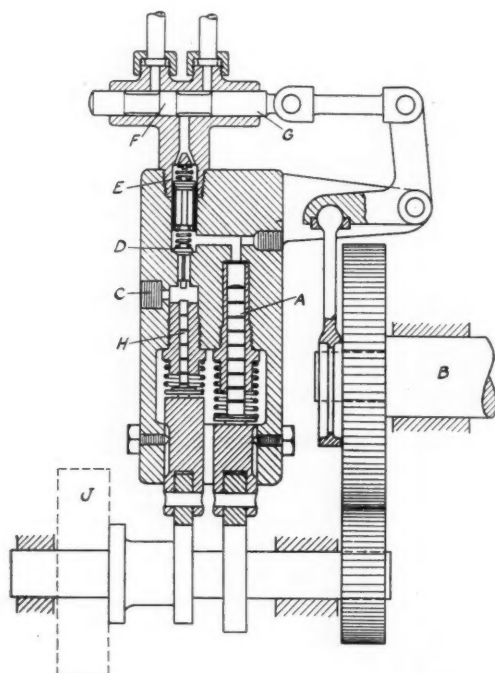


Fig. 5. Danielson fuel pump and distributor for two-cylinder two-stroke engine

matically in Fig. 3. The fuel pump A, of the piston type, operates at low speed and supplies the "accumulator" B with fuel at a more rapid rate than it can be burned, this excess supply being kept under pressure. A relief valve C, operated by the motion of the piston within the accumulator, permits of the return of the unused fuel to the supply tank.

On each of the cylinders there is a positively opened needle valve D, the opening of which permits of the

injection of fuel. Another needle valve E, operated by the same cam F, admits highly compressed air, which "diffuses" the atomized jet and insures perfect and rapid combustion.

Control being effected through the intermediary of the cam, the fuel and the injection air are controlled at the same time, hence the fuel-air ratio remains constant. A small compressor furnishes the necessary compressed air. The presence of air bubbles in the tubing after reassembling is said not to influence the operation of fuel injection in any way.

Details have been published recently of the Hesselman engine, a Swedish design built in Germany by the Allgemeine Elektrizitaets Gesellschaft, which, while not of the automotive type, is of interest because of its special provisions for insuring rapid and complete combustion. The piston head (Fig. 4) is domed and provided with a circumferential flange which when the piston is in the top dead center position is practically up to the cylinder head. The injection nozzle, which is mounted centrally in the cylinder head, has five radial outlets, evenly spaced over its circumference and directed at a slight downward angle (17 deg.), so that the spray jets are practically parallel with the domed wall of the piston head.

Deflector on Inlet Head

The inlet valve is provided with a deflector S on its head, extending half way around its circumference, which is claimed to result in a rotary motion of the air in the combustion chamber, in such a way that all of the air comes in contact with one or the other of the spray jets. In practice the best angular position of the deflector or screen is determined by turning the valve stem guide until the fuel consumption is a minimum, and the exhaust is smokeless. The adjustment is then locked by means of a lockwasher K. It will be noticed that the valve stem is provided with a key, which prevents it from turning in its guide.

A pump designed for a two-cylinder two-stroke engine is illustrated in Fig. 5 and is the invention of A. U. S. Danielson of Stockholm, Sweden. There are two plungers, A being the pump plunger and H a plunger which holds the inlet valve open during the suction stroke and part of the delivery stroke. These two plungers are operated by cams on a shaft which is rotated through gearing at twice crankshaft speed. Fuel enters the pump at C and passes through the inlet valve D to the pump barrel, whence it is forced during the delivery stroke through the delivery valve E into the distribution chamber F. From the latter it is admitted alternately to the two cylinders by the piston-type distributor valve G, which is actuated from the crankshaft through an eccentric, eccentric-strap and bell-crank. Governing is effected by holding open the inlet valve D for a smaller or larger fraction of the delivery stroke by means of the plunger H. The timing of the latter relative to the engine cycle is controlled by the governor, which is indicated at J.

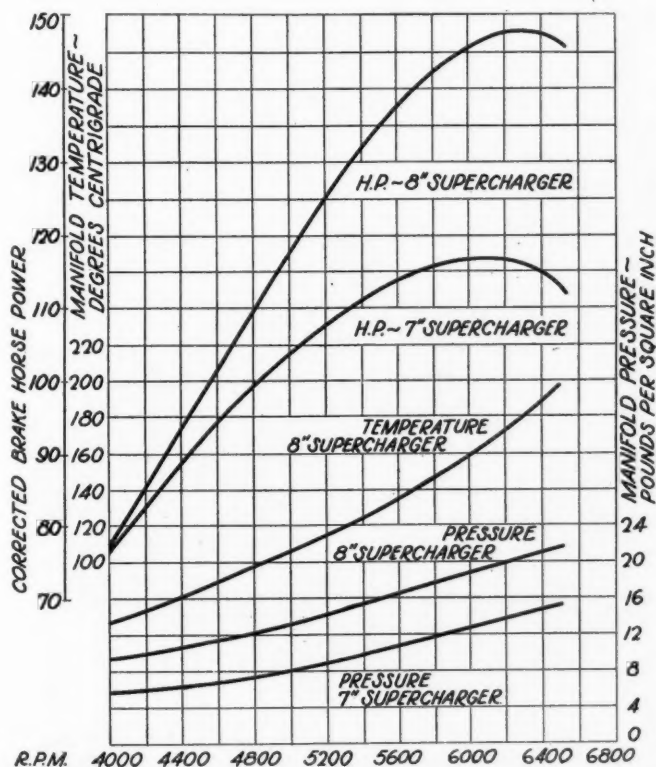
AT the recent meeting of the International Acetylene Association in Chicago, the Morehead gold medal, which is presented annually by the Association for exceptionally meritorious service in connection with the production and application of calcium carbide and acetylene, was awarded to the Underwriters Laboratories, Inc., in recognition of the Laboratories' contributions to the safety and standardization of various apparatus in which acetylene is made and used. President Dana Pierce accepted the medal for the Laboratories.

Supercharged Racing Engine Power Curves *Are Charted*

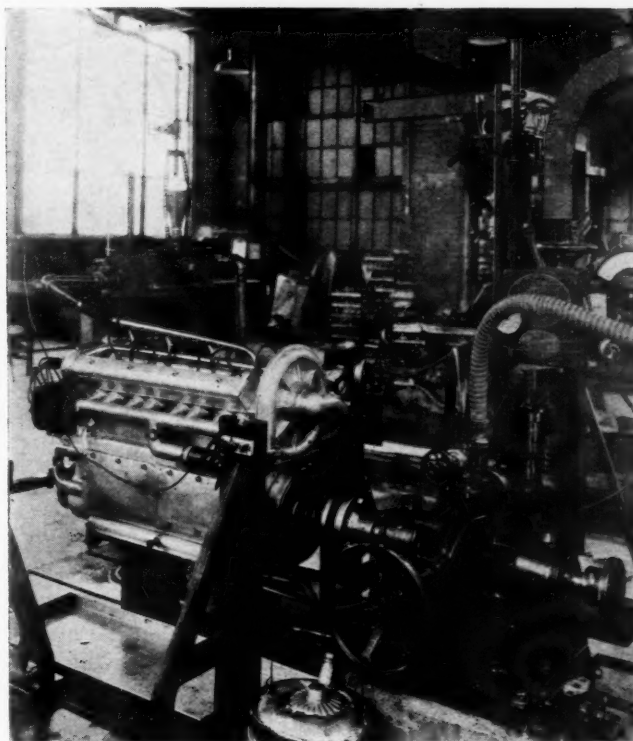
By David Gregg

MANY of the automotive and aeronautical engineers who are watching with interest the development of small high-speed racing engines will undoubtedly be interested in the power curves of a 91 cu. in. Miller engine, obtained in the laboratory of the AC Spark Plug Co.

There is frequently a wide variation in the power obtained from two racing engines of the same size and make. Much depends on the mechanic who assembles the engine, on the fit of the various parts, the clearances, timing, and adjustment of the carburetor and the supercharger. Racing drivers and their mechanics are trained to tell whether some slight change in adjustment increases or decreases the car speed, but few of them have the facilities for making a thorough laboratory test.



Horsepower and manifold pressure and temperature curves obtained from Miller racing engine when fitted with 7 in. and 8 in. supercharger, respectively



Showing Miller eight-cylinder racing engine on dynamometer stand in AC laboratory

The value of a test of this nature depends solely upon the accuracy with which it is made. The curves reproduced here represent the maximum power that could readily be obtained, and which could be duplicated from time to time. They were run under the direct supervision of a former Bureau of Standards laboratory engineer, while the engine was kept in first-class operating condition by an experienced A.A.A. racing mechanic.

Power output was obtained by a Froude hydraulic brake, and the various measurements were taken with properly calibrated and checked instruments. The engine was covered by a cowl (not shown in the illustration) and a Sturtevant blower driven by a 25 hp. electric motor forced a blast of air over it to assist in cooling and to approximate as closely as possible actual track conditions. During the tests the cooling water was kept between 160 and 180 deg. Fahr. The lubricating oil was circulated through a bank of filters and a cooling tank by a separate electric pump, so that the engine received an oil supply under constant temperature conditions. No readings were taken until stable conditions were reached, and the maximum power readings were taken after the load had been held for at least two minutes.

The lower curve was obtained when using a centrifugal supercharger having a 7½ in. impeller, as used by the majority of drivers during the 1926 season. The second curve was made with the same engine, and a new supercharger with an 8 in. impeller and bronze casings, as used on the tracks this past season. Mixture temperatures were obtained by means of a thermocouple inserted in the intake manifold connecting the supercharger to the engine.

The Miller engine is a straight eight, overhead valve design of 2 3/16 in. bore by 3 in. stroke. Ignition is by magneto. A single carburetor, usually 1¾ in., feeds through a centrifugal supercharger driven by a train of gears from the crankshaft.

Two-Way Machines Save Set-up Time on Chrysler Axle Housings

Trouble due to springing also avoided by performing similar operations on both ends of the housing simultaneously.

By K. W. Stillman

AN interesting feature of the methods employed at the Chrysler plant for producing axle housings is that, wherever possible, two-way machines are employed so that identical operations can be performed on both ends of the housing simultaneously. In this way it is believed that considerable trouble is avoided in the finished product due to springing of the piece and, of course, a great deal of set-up time



A two-way Defiance machine employed by Chrysler for semi-finishing and finishing both ends of the Model 80 rear axle housing

is saved over the method which operates on each end independently.

The number of operations in which it is possible to make use of this plan is exemplified in the methods used on the Model 72 axle. In the very first operation after the rough piece has been inspected, it is placed on a Barnes two-way horizontal boring machine where $3\frac{1}{8}$ and $2\frac{9}{16}$ in. holes are bored on each end and chamfered. Fig. 1 shows such a machine in operation; the particular housing being machined is for Model 62 rather than for the 72, but the methods are the same.

Spot welds are next removed from the interior of the housing by an end mill operated by an Ingersoll-Rand air motor. Then the banjo face is milled on both sides in a Baker drill press and the housing is straightened in a Greenard arbor press.

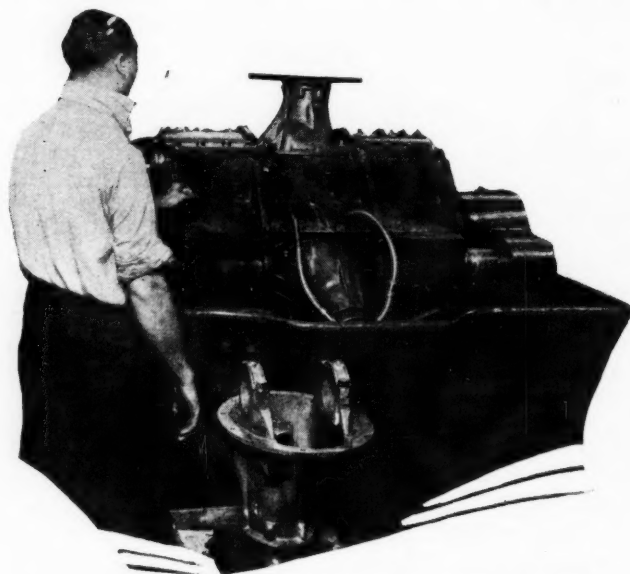
Another two-way operation follows in a Sundstrand lathe where the outside diameter of both ends is turned

and straddle faced, both flanges are chamfered and a 3.530 in. diameter turned on both ends. Each end of the machine is fitted with front and rear toolblocks for performing these various operations.

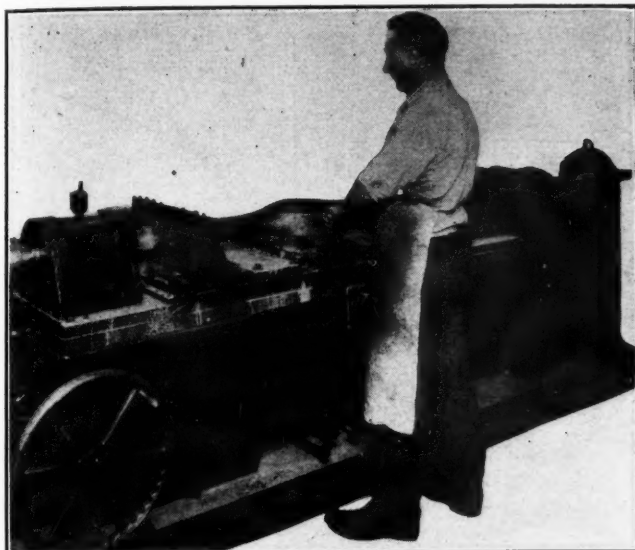
Another two-way Branes drill press is employed to drill 10 holes in each side of the banjo face and they are countersunk both inside and outside at a bench with an air tool. The holes are then tapped in a Fox multiple spindle tapper and 12 rivet holes and 12 bolt holes are drilled in both flanges with a Garvin two-way drill. These last holes are countersunk on the inside and outside of both flanges at the bench.

Two $\frac{1}{8}$ in. pipe holes are next drilled and tapped on a 21 in. Cincinnati drill press and the housing then passes to another Barnes two-way machine where the bore and two diameters of the ends are semi-finished and the large bore finished. This particular machine is fitted with a three-station work-holding fixture so that the semi-finishing and finishing are carried on simultaneously while the operator is unloading a finished housing and loading another. Barber Coleman reamers are used for the finishing operation.

In Fig. 2 is shown a machine set up for this operation. The machine shown is a Defiance and is working on Model 80 housings but working principles employed are identical with those used on the Model 72.



Another example of the use of two-way machines at the Chrysler plant. A two-way Defiance fitted with three station, work indexing fixture, semi-finish and finish boring both ends of a Model 80 differential carrier simultaneously



Barnes two-way horizontal drill press used by Chrysler for roughing both ends of Model 62 rear axle housing

The final machine operation on the housings is to ream the 12 bolt holes in the flanges, which is done simultaneously at both ends by means of a Greenlee two-way horizontal drill press. Following this the housing is washed in a Niagara washer, is burred and blown out and is then ready for final inspection.

Chromium-Plating Patents

A STUDY of patents dealing with the electro-deposition of chromium has been made by Richard Schneidewind, assistant investigator of the Department of Engineering Research, University of Michigan, and the results are published in Engineering Research Bulletin No. 8, published by the University at Ann Arbor, Mich.

The author says the patent situation in the United States, as well as in Europe, has very considerably retarded the development and general adoption of chromium plating as a means of improving the appearance and utility of metallic articles. Many large manufacturers, although they felt that public taste was turning toward this bluish metal, which has such a remarkable resistance to tarnish, have hesitated to apply it to their products. The study of the patent situation made at the University of Michigan was undertaken in the hope that it might clear away some of the misapprehensions and misunderstandings regarding the degree to which the process of chromium plating is limited by the present patents, and thus to open the way to its much wider application and use. The author gives the following summary of his findings:

"1. Very little important information has been disclosed in the patent literature which is not antedated by information published in the scientific literature.

"2. Although good fundamental research on chromium plating was done by Carveth and Curry in 1905, it resulted in no immediate commercial interest. Their solution, however, is a usable one. Commercial chromium plating probably began on a small scale in Germany as a result of patents granted to Salzer in 1907 and in 1909. Due to factors of which he was unaware, his solutions did not give uniformly good results.

"Baum was granted a patent in England in 1913 for a process of making chromium-plated filament holders for electric lights. This filament holder aroused no

enthusiasm and so his method of plating, incidental to the process, was forgotten. His bath, however, was a good one; the formula published in the specifications of the patent was not claimed.

"The first good bath that awoke commercial interest was fully described by Sargent in 1920. This bath is essentially the bath used most generally at the present time. A year later Grube, a German, applied for a patent on a solution essentially the same as Sargent's. In the years immediately following, chromium plating developed rapidly on a commercial scale. Although much interest has been aroused and many patents have been taken out, nothing new of a very fundamental nature has subsequently been developed. In fact, most modern baths, although they may have been prepared in different ways, will prove, when subjected to a chemical analysis, to have almost identical components in almost identical relative proportions.

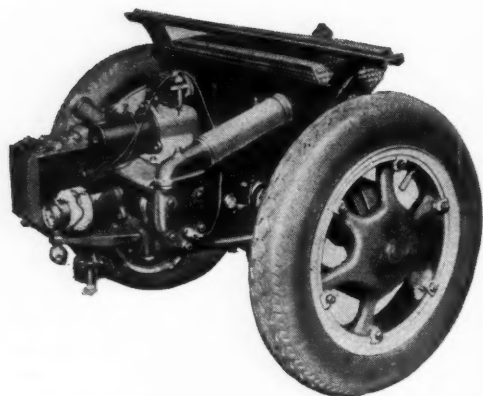
"3. The relative merits of the baths and of the plating methods are discussed along with the detailed description of each patent. Inasmuch as so many of the solutions upon analysis prove to be nearly alike, it is almost self-evident that, with slight modifications, they will give very similar results. * * *

"4. In the writer's opinion, it is doubtful whether there is any patent or group of patents which can control the process of electro-deposition of metallic chromium from chromium acid baths. Only a court decision, however, can make this opinion an established fact. Yet, a study of the published (not patented) researches of Carveth and Curry, and of Sargent, and a study of the expired patents of Salzer and Baum will prove very enlightening, and will show that the most recent patents are mere restatements of known facts and that such refinements and modifications of known processes as are revealed in some of them are not essential to the process."

RAILROADS, recognizing the importance of trucks in loading and unloading freight in freight cars and at freight-house platforms, are taking steps to accommodate team tracks and freight station driveways to maximum motor truck dimensions. In a report prepared by the Yards and Terminals Committee of the A.E.R.A., to be submitted to the association's convention in March, 1928, it is recommended that the proper width of team-track and freight-house driveways be determined by a maximum truck size of 8 x 27 ft. It is felt that there will be no further tendency to increase the maximum size of trucks now being operated in these services, particularly since the maximum overall length of trucks operated today ranges from 25 to 27 ft. The report is based on results of a questionnaire to freight houses and observations on traffic and delays in team tracks and the resulting relations between the delays and widths of driveways.

The increased use of the truck in the handling of freight and the inadequacy of many of the present driveways built when the horse-drawn vehicle was principally used have greatly prevented the realization of maximum truck and transfer efficiency.

As a result of the investigation it was concluded that a team-track should normally be wide enough to allow the longest trucks to stand at right angles to the freight car, with sufficient space remaining in front of the truck to permit another truck of maximum width to pass. It was decided that nearly all commodities handled on team tracks are adapted to side loading of trucks, of which only about 10 per cent are so equipped.



Above—The Pak-Age-Car power unit

Right—Pak-Age-Car designed primarily for retail milk delivery



Stutz to Take Over Distribution of New Pak-Age-Car

Latest model is designed primarily for retail milk delivery.
Overall width only 53 in. Price \$995 at Chicago

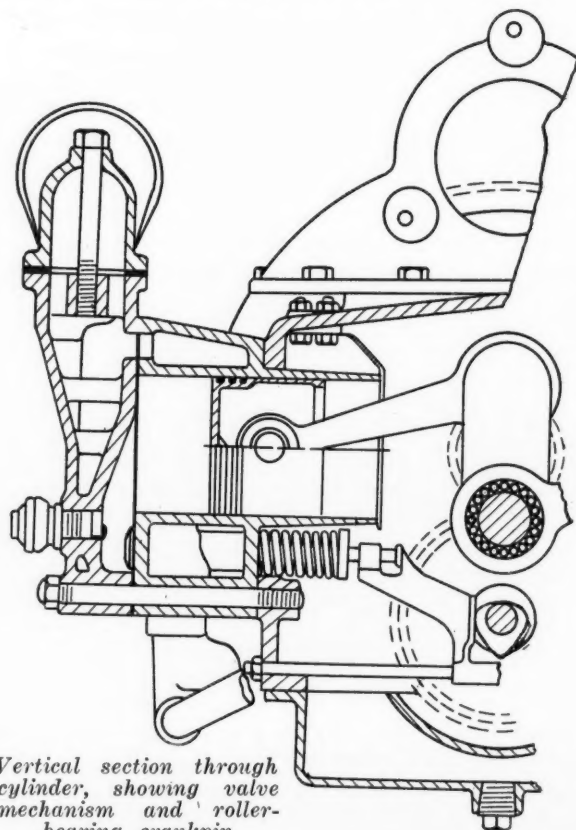
A NEW model of the Pak-Age-Car, designed primarily for retail milk delivery, is ready for the market and will be distributed by the Stutz Motor Car Co., Indianapolis, through its sales organization. The vehicle is manufactured by the Package Car Corp. of Chicago.

The new car is somewhat larger in overall length and interior capacity. Its wheelbase is 92½ in.; overall length, 123½ in.; overall height, 88 in., and minimum inside standing room, 72 in. One of the outstanding features of the wagon is the overall width of only 53 in., which makes it easy to handle in traffic. The storage space required is only 50 sq. ft.

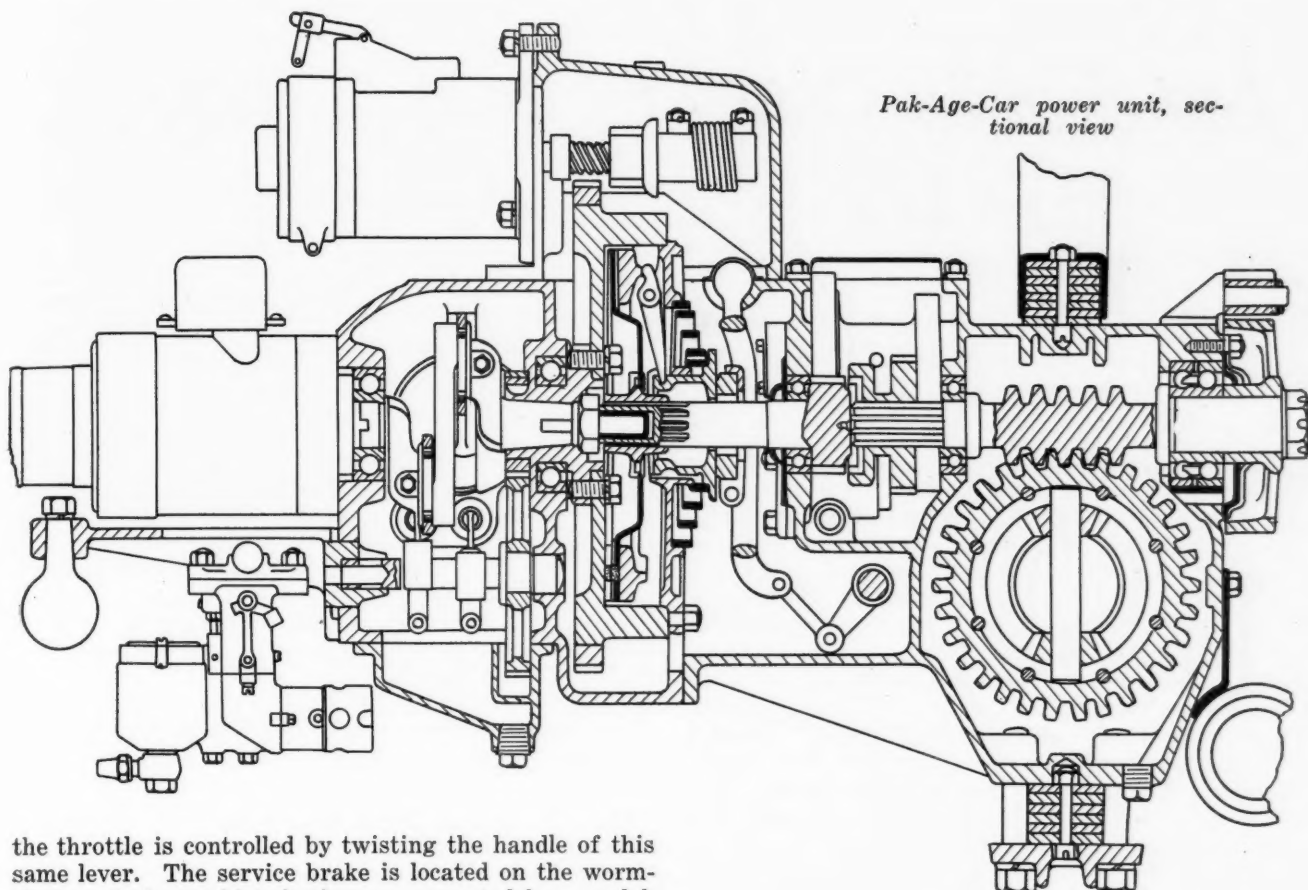
The body is made entirely of steel and metal veneer panels and is supported on springs at both front and rear. Standard bodies are provided with brackets to which may be attached a great variety of racks, in order that many different types of containers may be handled. They are fitted with electric headlights, tail-light and license bracket, interior dome light and horn. The body is finished inside and out with white undercoating, making a suitable base for oil paint or lacquer finishes and advertising signs. The volume of the standard body is approximately 216 cu. ft., of which 160 cu. ft. is useful for loading purposes. All the windows are of Protex safety glass.

The engine, as formerly, is mounted directly on the rear axle. The new model, however, uses a hardened and ground crankshaft, on which are mounted connecting rod roller bearings and ball main bearings. The bore and stroke of the two-cylinder horizontal opposed engine are 3⅛ and 3 in., respectively. The valve mechanism comprises a U-shaped cam follower which assures a mechanical return, thus permitting the use of very light valve springs.

The control of the vehicle is of the dual type, as before, with controlling levers at both sides of the driver's compartment. Clutch and service brake are controlled by the same lever by a fore and aft movement, while



Vertical section through cylinder, showing valve mechanism and roller-bearing crankpin



the throttle is controlled by twisting the handle of this same lever. The service brake is located on the worm-shaft and the parking brakes are operated by a pedal, equipped with a locking ratchet.

The truck is expected to operate entirely in high gear under all normal conditions, and to facilitate starting an unusually large Borg & Beck dry disk clutch is used. The fuel consumption is said to be approximately 1 qt. of gasoline per hour and 1 qt. of engine oil per week.

The car is designed for a maximum full load speed of 15 m.p.h. and a maximum speed without load of 18 m.p.h. The price quoted by the company is \$995 f.o.b. Chicago.

Sterling Six-Cylinder Truck

THE Sterling Motor Truck Co., Milwaukee, Wis., announces a new light six-cylinder truck chassis known as its Model DB-8. It is designed for carrying loads up to $1\frac{1}{2}$ tons and to run at speeds up to 35 m.p.h. The engine has a bore of $3\frac{1}{2}$ and a stroke of $4\frac{1}{2}$ in.

(260 cu. in.) and develops 56 hp. at 2200 r.p.m., at which speed it is governed. The crankshaft is supported in seven bearings and the cylinder head is of the Ricardo type and removable.

The piston pin bearing measures $\frac{3}{4}$ by 2 in. and the connecting rod bearing 2 by $1\frac{1}{2}$ in. All main bearings are $2\frac{3}{8}$ in. in diameter, the front bearing being $1\frac{3}{4}$ in. in length, the intermediate bearings $1\frac{1}{2}$ in. and the center and rear bearings $2\frac{3}{4}$ in. The connecting rod has a center-to-center length of $8\frac{3}{4}$ in. The valves have a clear diameter of $1\frac{5}{8}$ in. and are operated through hollow, case-hardened and ground pushrods of $\frac{5}{8}$ -in. diameter. A Zenith carburetor is used and ignition is by the distributor system. Lubrication is by force feed to all bearings.

The transmission is of the three-speed-and-reverse, sliding gear type, and a multiple disk type of clutch is used. Both service and emergency brakes are applied to the rear wheels. The steering gear is of the cam and lever type and is operated by an 18-in. wheel. The wheels are of the metal-spoked type and are fitted with 32 by 6 in. tires. All springs are semi-elliptic, the front springs measuring 40 by 3 in. and the rear 54 by 3 in.

The standard wheelbase is 150 in., but a long wheelbase of 164 in. is also offered.

The chassis weight is 4200 lb., the load capacity 3000 lb. and the body allowance 800 lb., making the maximum total weight 8000 lb.



Sterling Model DB-8 six-cylinder truck

Lubrication One of Chief Troubles in Bus Engine Design

Full forced feed to all working parts is essential, says H. D. White. Provision for properly cleaning the oil is desirable. Elimination of oil leaks demands attention.

AN interesting comparison of the different cylinder types in use in motor coach engines was made in a paper presented at the recent convention of the American Electric Railway Association by H. D. Church, director of engineering, the White Motor Co. Mr. Church pointed out that there is something to be said in favor of each of the three types of cylinder construction in use today, namely, the sleeve-valve cylinder, the L-head cylinder and the valve-in-head cylinder.

The sleeve-valve engine has an ideal form of combustion chamber and spark plug location, but is subject to lubrication difficulties and hot pistons. The L-head is the simplest and lowest first-cost construction which can be used, and with a proper shape of combustion chamber and proper spark plug location gives good results, but for the same detonation does not give as high mean effective pressure as the sleeve valve or the overhead valve type. The conventional overhead valve engine has an ideal form of combustion chamber but it is difficult to locate the spark plug near enough to the center of the charge. With proper ignition design, the overhead valve engine is like the sleeve-valve engine in that it will give high mean effective pressure for a given detonation. The greatest objection to it is that more parts are required for valve actuation, and that unless the design is very carefully worked out there is a tendency toward noisy valves.

Limitation on Engine Bore

As regards cylinder size, Mr. Church said that with present fuels detonation imposes a distinct limitation on the bore. It is not likely that cylinders of a larger bore than 4½ in. will be used, owing to difficulties with detonation and cooling of piston heads.

The engine lubricating system is at the root of many troubles today. Full forced feed to all working parts is essential. Provision for properly cleaning the oil is desirable, and an oil cleaner which will continue to function without frequent service attention would be valuable. A simple design of oil cooler is desirable in order to maintain proper viscosity in hot weather, as the life of all the working parts of the engine is materially increased by keeping the oil viscosity up at all times.

A lubricating detail which should be given more attention in design is the elimination of oil leaks. An engine or chassis unit which is all covered with dirt externally as a result of oil leaks is hard to inspect for condition, and difficulties which may have developed are less likely to be discovered.

The importance of rigidity on the life of the working parts can not be overestimated. A sufficiently stiff crankcase and crankshaft design will go a long way toward the elimination of bearing troubles, and the at-

tendant expense. Stiffness of the cylinder block and head is also important. A rigid single block of cylinders greatly helps in stiffening the crankcase. With the detachable cylinder heads almost universally used, the design should be such that the tightening of cylinder head studs does not distort the valve seats or guides.

Improvements in the induction system are coming which will give better distribution, higher mean effective pressures for the same detonation, and better economy with the present-day low volatility fuels.

All engine accessories, with the possible exception of the fan, should be positively driven through inclosed and automatically lubricated chains or gears.

Lower Unit Clutch Pressures

Clutches will probably have lower unit pressures and better provision for heat dissipation in order to prolong the life of the facings. Some provision to insure a really soft and progressive engagement throughout the life of the facings is highly desirable, as it will save wear and tear on the entire driving train between the clutch and the rear wheels. It is probable that pedal pressures will be decreased in order to prevent driver fatigue.

Transmission modifications are to be expected in the directions of easier gear shifting and greater silence in the geared speeds.

Chassis frames are being designed to give greater resistance to twisting which should permit the use of lighter bodies without sacrifice of body life.

There is a strong trend toward greater accelerative ability, to enable the coach to keep its place in modern traffic; by the same token better brakes are needed. Mr. Church gave it as his opinion that metal-to-metal brakes on all four wheels, operated by compressed air or some other form of servo device, will soon be considered indispensable. This construction utilizes the entire vehicle weight for braking traction, requires little muscular effort of the driver, is excellent from a cooling standpoint, and its action is practically unaffected by oil, water or grease on the braking surfaces.

Low Pressure Tires

The use of low pressure tires should become more general due to the demand for increased passenger comfort. In addition, there should be a distinct decrease in chassis depreciation. The more widespread acceptance of low pressure tires has probably been somewhat delayed by cases of poor service caused by overloading, by constructional difficulties in the larger sizes experienced by some manufacturers, and by the greater tendency toward front wheel shimmy. Progress is being made in running down the causes of shimmy, and the solution will eventually be found. Low pressure tires have one other drawback in that they require a greater

mechanical advantage in the steering gear. This is not a serious condition but is one which will have to be given attention.

There will probably be distinct improvements in chassis lubrication. The lubricating requirements of a motor coach chassis are exceptionally severe, due to the high mileage per day. Many of the points requiring lubrication are inaccessibly located with the result that they are neglected, or else the time required to get at them is too great. The solution may be some form of central lubrication or thoroughly housed construction carrying a sufficient supply of lubricant for long periods of operation.

The question of riding qualities is also due for consideration. The variation in spring load between a part passenger load and a full passenger load is great, and means should be provided to insure comfort under both conditions.

Two very important items are body heating and ventilation. The exhaust gas heating system, which has been extensively used in the past, will probably be replaced by some system using water or air in order to eliminate, as far as possible, the leakage of any exhaust

gas into the body interior. Some satisfactory provision to give adequate body ventilation without draughts is also most desirable.

Considering for a moment the more radical design possibilities, there are several promising developments in sight. The double rear axle construction, which has been used for the past few years both in this country and abroad, is attractive from the standpoint of good riding qualities, less damage to road surfaces, and ability to carry the maximum loads on pneumatic tires within a limited overall width. This construction involves some difficulties in taking care of the torque reactions from the driving and braking loads. Unless a differential is used between the two axles, each one should be heavy enough to handle full torque requirements, which means extra weight and cost. Further developments are to be expected in this construction.

From the standpoint of traffic congestion, the present-day motor coach probably represents the top limit on overall length. It is possible that future developments may result in a complete relocation of the various chassis units in an endeavor to obtain more seating capacity within the present overall length.

German Firm Builds Non-Stallable Plane Which Won't "Nose Over"

A NEW type of airplane which is said to possess the advantages that it cannot be stalled and that it cannot "nose over" on the ground has been built by Focke-Wulf Flugzeugbau of Bremen, Germany, and is called by the firm its Type F-19 "Ente" (Duck). The aerodynamic principles underlying the design of this plane were proved out by investigations and tests in the Göttingen Aerodynamic Laboratory extending over months. It was found that as finally designed the plane possessed flying characteristics which are not materially different from those of a normal commercial plane. The properties of non-stallability and immunity from nose-overs, it is pointed out, should add materially to the safety of flying in the future.

The weight distribution in the new machine is as follows:

1. Power plant.	
Two Siemens engines	640 lb.
Starter	6.6
Two propellers with hubs	66
Two fuel tanks (24 gal. capacity each)	53
Two oil tanks (3.2 gal. capacity each)	13.2
Engine accessories, instruments, muffler	59.5
Powerplant	838.3
2. Plane.	
Fuselage with cabin	728 lb.
Fuselage accessories	55
Control	37.5
Rudder	29.6
Wing with ailerons and engine mount	529
Front wing with elevators	132
Rear wheels and mount	132
Front wheel and suspension	33
Empty weight	2514.4
3. Load.	
Fuel for three hours 275 lb.	
Oil 33 lb.	
308 lb. Pilot 176 lb.	484
Three passengers at 165 lb. each and 11 lb. baggage..	506
Total load	990 lb.
Flying weight	3504 lb.



Focke-Wulf single-decker with small front wing, which is said to be non-stallable and proof against "nose-overs"

The initial flight in this plane was made on Sept. 2 by Mr. Wulf, the designer. The machine rose to an altitude of about 500 ft. and remained in the air for about 10 minutes. The pilot flew over the starting point at an altitude of about 650 ft. and raised both hands as an indication of the complete stability of the machine. After describing a number of curves over the southern outskirts of the city, of which several were flown with the front wing unlocked and set at an angle laterally, the pilot shut off the engine and the machine went slowly into a glide, without the use of the elevators. Upon setting the elevators when approaching the ground, the angle of incidence increased continually, exactly the same as with a conventional machine. Contact with the ground was established first with the rear wheels, after about 325 ft. had been covered, since the elevators were set. After another 160 ft. the front wheel hit the ground softly. The elevators being raised again, the machine rose off the ground once more and then gradually came to a stop.

The short test is said to have shown that the machine has a speed of about 90 m.p.h. with the two 75 hp. engines, that it is quite stable about all three axes and that all of the controls are powerful and precise.

THE FORUM

Compression-Ignition Type Engine Problems Discussed

Increase in fuel consumption with speed is pointed to as indicating that combustion efficiency of high speed engines of this kind is low.

Editor, AUTOMOTIVE INDUSTRIES:

The array of documentary evidence given by Professor Norman in your issues of Sept. 17 and Oct. 15 should, perhaps, assure us that vaporization is not a real problem in the "comp-ig" (short for high-speed, compression-ignition engine). But many German savants are just a trifle authoritative. An essential characteristic of development engineers is, on the other hand, a questioning mind. This should extend to just this side of where a suspicious nature tends to spoil genial personality.

Part of Professor Norman's letter might leave some doubt as to whether it is the automotive comp-ig that is under discussion. For example, the Hvid scheme is not commonly considered suited to the flexibility required in automotive service. Some engineers go so far as to take exception to hot bulbs and pre-combustion chambers in general for use in automotive comp-igs. Had we no carburetor engine, developers of the comp-ig could probably lean back, and there are more than Professor Norman who believe that the development of the comp-ig in this country has been blocked. However, money cannot take the place of imagination and vision; and the opportunity may be ready for the comp-ig before the scientist is on hand with essential knowledge.

Needs the Benefit of R. P. M.

For automotive service the comp-ig has got to have the benefit of r.p.m. But what do we find? At 800 r.p.m. and with a permissible maximum pressure, fuel consumptions can be obtained below 0.40 lb. per b.hp.-hr. At 1200 r.p.m. the fuel economy approaches 0.45 lb. per b.hp.-hr.; and taking Professor Norman's information about the Frey engine, the fuel economy at 2400 r.p.m. has jumped to 0.55 per hp.-hr. (we assume b.hp.-hr.). At 3000 r.p.m. the economy would probably be at least from 0.75 to 0.80 lb. per b.hp.-hr. at a capacity per cubic inch of piston displacement less than that obtainable from the carburetor engine.

Now, since the r.p.m. of the carburetor engine is being increased, and Professor Norman quotes some noteworthy r.p.m., and since a fundamental purpose of the comp-ig is to take advantage of high compression,

a value of 0.55 lb. per b.hp.-hr. at 2400 r.p.m. deserves not to pass. This value is 50 per cent greater than the economy obtainable below 1000 r.p.m. And one of our favorite claims, speaking not as promoters but as engineers, is that, in so far as the load itself is concerned, the fuel economy of compression-ignition engines is attractively flat.

The citation from *Der Motorwagen* that "the speed of the injection and combustion is no longer the limiting feature of the high-speed Diesel," seems too sweeping. Let us question this situation. The fuel economy depends upon the product of the cycle efficiency, the cylinder efficiency, and the mechanical efficiency. Take the fuel economy as 0.55 lb. per b.hp.-hr. at 2400 r.p.m. Carburetor engines can surpass this value. Since compression-ignition is used, a higher cycle efficiency should obtain with the comp-ig than with the carburetor engine. Since German mechanics did the work and the design probably has no stepped pistons, the mechanical efficiency should at least be fair. This leaves the cylinder efficiency for the brunt of our questioning.

The two primary conditions affecting cylinder efficiency are heat loss to jacket and combustion efficiency. Assuming good combustion chamber design, the jacket losses should not be unusual unless excessive temperatures prevail, a condition which probably would be denied by the *Der Motorwagen* writer. This leaves the efficiency of combustion as the possible cause of the high fuel consumption.

The efficiency of combustion in a comp-ig involves injection and atomization, turbulence and fuel distribution, chemical and thermal reactions. Nozzle action can be well observed and hence largely corrected. Turbulence is controllable in a measure. This leaves combustion processes as probably the weak link. The weakness is most probably owing to lack of sufficient intimacy of contact between fuel and air.

Instead, however, of depending on intimacy of contact for efficient combustion a German is cited by Professor Norman as raising the issue of "the possibility of introducing sufficient air." The better fuel economy per b.hp.-hr. with air rather than airless injection, might make this statement subject for discussion. Further,

volumetric efficiency will hardly fall off as fast as these fuel consumptions climb.

Some years ago, P. L. Scott introduced us to the term mechanical vaporization. Such would be the theoretical limit for the injection system. The excellent work by Hesselman shows the benefit of turbulence. But exact information of the limits to the rate of vaporization based on engine conditions is, we think, still wanting. The irony referred to by Professor Norman was slipped into the letter by the reader.

Combustion Problem Recognized

But let us assume that vaporization is not an essential. Agreement that there is a combustion problem is common. Carbon, it is claimed, has a greater affinity for itself than for anything else, and our hydrocarbon fuels are from 70 to 85 per cent carbon. Access to oxygen by the carbon at the proper time and in the right condition evidently does not occur in our present comp-igs. It would seem, then, that by considering the vaporization problem as *passé* we have thrown out of consideration one of the few desirable physical conditions which we are fairly sure is conducive to desirable combustion. We have thrown out the old before the new is ready. As intimated in an earlier letter, we need discovery rather than invention.

And now a line about the pessimism. A pessimist died, and some of his friends were gathered about his bier. He was a good fellow, said one, but he used the world as a football. At that the corpse opened one eye, and said, "Yes, but I always kicked toward the goal."

The goal for us is an easy-starting, flexible, automotive comp-ig that shall excel the carburetor engine in fuel economy and in service, and that shall be able either in a traffic jam or in the dark to be close by us without spreading—as does the ordinary carburetor engine—a tell-tale on the air.

ROBERTSON MATTHEWS.

An Instruction Book Written for the Workmen

Editor, *Automotive Industries*:

The recent comments in *The Forum* concerning the contents of instruction books have been rather interesting to me as they recall the discussions which came up some years ago when I was assigned the task of writing up the instruction book for a new model car which had not yet been assembled.

Under these circumstances, it is at once evident that the editor of such a book could not be in possession of knowledge as to where trouble *had* occurred. If he tried to predict where trouble *would* occur later, he would naturally be in bad with his superiors, who would not agree with him or else they would change the design.

Again, there was a question as to the purpose of the instruction book. The policy previously adopted by the company had been that no owner would do any more work on his car than he could help unless forced to in an emergency. The instructions given had therefore been only such as might help the owner to make such adjustments or diagnose the trouble close enough to get him to a garage for the final work.

Incidentally, the company *had not wanted to give any information of value to its competitors*. To me, this idea was foolish as anyone knows that when a competitor brings out a new model or design with apparent worth—most companies make it their business to know the

details by either buying, borrowing, begging, or, if necessary, stealing one long enough to thoroughly examine it. I am sure, however, that though the examiners have eyes, they often fail to see what is of most value in the new design. Stealing ideas or information is something to be deplored and yet is practiced by many concerns that would have a workman jailed for taking a cotter pin. For instance, I know of one of the largest concerns in this country, which, within 24 hours after their completion, usually had blueprints of its competitor's tracings of value.

The policy of having the instruction book primarily for the use of the workman, regardless of whether he be owner or not, finally carried. I next argued that the man who could do the work—would find his own best methods provided he knew the inside construction. I claimed that a sectional drawing (not a blurred half-tone) of an engine was worth more to the workman than 50 pages of printed matter through which a workman may hunt for an hour and then not find the information sought. A section drawing with parts clearly marked for reference purposes, together with a few concise notes regarding details, will be all that is needed in caring for troubles which are not even dreamed of at the time the instruction book is printed.

I have seen no reason to alter this policy after more than 20 years in the industry.

M. R. WELLS.

Another Opinion on Automotive Instruction Booklets

Editor, *AUTOMOTIVE INDUSTRIES*:

I can say "Amen" to everything that H. F. Marshall says in the *Forum* of your Nov. 12 issue.

I, too, have had experience with mechanics in "authorized service stations" who have had to go on a voyage of discovery to find out what was wrong, and have come out on a River of Doubt.

I, too, like to care for my own car and do some of the repair work on it. And even if I did not I would have a great sense of comfort, in an emergency, if I knew I could "look in the book and see" how to do this or that needed thing.

I cannot see how an instruction book can tell too much. What the reader already knows he can skip. There will always be some owners who are mechanically-minded but who can use and need simple, complete instructions about this or that.

And illustrations by all means. And lots of them. One picture can tell more than a page of type whether the reader is a novice, or expert looking at a new assembly.

Many a man cannot recognize a certain gadget by name, but a picture helps him much.

The book for the car I now drive all too often says, "Consult an expert at authorized service station" or words to that effect. And it makes me mad. The "expert" will probably hand the job over to some apprentice and then forget to check his work. And with a good instruction book I could do as well as either or both of them.

One loud "Aye" from me for complete, clear, explicit, illustrated instruction books.

L. C. BURKE,
Madison, Wis.

Four Variables Which *Affect* Car Performance Are Discussed

Dr. W. S. James of Studebaker Corp. tells S.A.E. Metropolitan Section that piston displacement, compression ratio, the gear ratio and car weight are principal factors to be considered.

By P. M. Heldt

ENGINE Characteristics as Affecting Car Performance was the subject of a paper presented at the December meeting of the S.A.E. Metropolitan Section by Dr. W. S. James, research engineer of the Studebaker Corp. Mr. James listed four variables that can be readily measured or stated in definite terms, and discussed their effects on acceleration and hill-climbing ability, maximum power and fuel economy. These four variables are the piston displacement, the compression ratio, the gear ratio and the car weight.

The discussion was based on three assumptions, namely, that the indicated mean effective pressure of an engine is proportional to the weight of air entering the cylinders per cycle, and to the air cycle efficiency; that the weight of air entering the engine is proportional to the absolute pressure in the cylinder at the moment the inlet valve closes, and that the weight of air entering the cylinders is reduced by the increase in the temperature of the air in its passage through the inlet manifold and valve passages. These assumptions, Mr. James said, had been checked on several engines of good design and had been found to be in agreement with actual conditions.

Mr. James then presented formulas for the indicated mean effective pressure developed by the engine as a function of the compression ratio, for the frictional torque and for the resistance to vehicular motion. As regards the friction losses, he found that they were made up of three items, one constant, another varying with the speed of the engine, and a third representing the pumping losses, which is an exponential function of the difference between atmospheric pressure and the pressure within the cylinder.

The paper was accompanied by numerous coordinate diagrams showing the effects on each of the four factors of performance of a change in one of the four variables. In

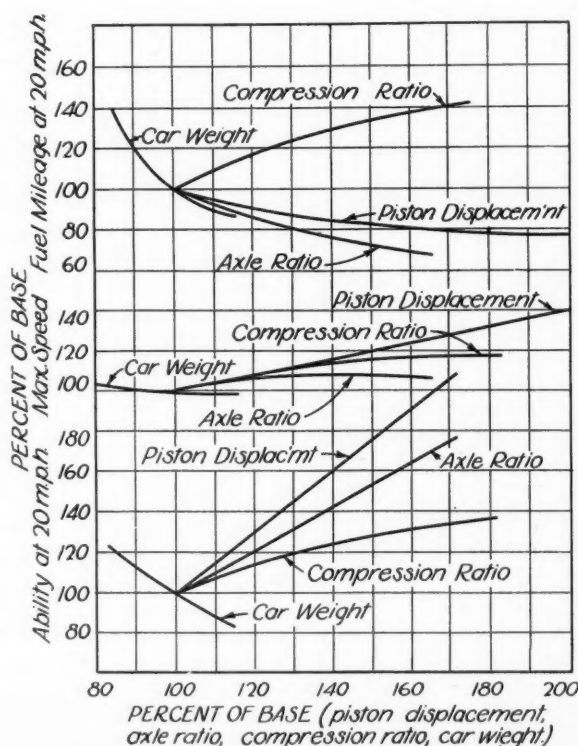
calculating the resistance to motion Mr. James figured with a coefficient of rolling resistance of 10 lb. per 1000 and with a coefficient of air resistance of 0.22.

The effects of changes in the variables were studied on a car weighing 3500 lb., the displacement being varied between 100 and 300 cu. in. and the compression ratio between 5 and 7. Curves were plotted showing the speeds and accelerations of the car fitted with 100, 200 and 300 cu. in. engines respectively, first when the rear axle ratio was the same for all and then when the rear axle ratios were inversely proportional to the displacements. In a final set of charts the effects of changes in the various variables, expressed on a percentage basis, were summarized. It was shown that so far as maximum speed is concerned, an increase in the displacement has a much greater effect than an equal proportional increase in the compression ratio. The effect of a change in weight, of course, is negative or contrary to like proportional changes in displacement and compression ratio, in that an increase in weight results in a decrease in maximum speed.

However, the effect of weight changes on top speed are much less than might be expected, owing to the great preponderance of air resistance at high speeds.

In summarizing his paper, Mr. James said the public was interested only in the final performance of the car and not in the exact manner in which it was obtained. From the discussion of the factors involved it seemed easy enough to get any desired performance, but usually, when any one of the factors was materially altered difficulties were encountered, not only in connection with details of construction but also in regard to cost of manufacture.

The discussion was opened by J. B. Macauley of the experimental department of the Chrysler Corp. He said that he was interested particularly in the factor of high compression in engines and had ex-



pected that the paper would deal primarily with that question, but that Mr. James "had not let a fuse hang around anywhere that he might set off." He had noticed, however, that in the charts presented, the effects of an increase in compression were found to be favorable in every case, which did not apply to any of the other variables. Moreover, an increase in the compression ratio did not cost the manufacturer anything, from which point of view it was decidedly preferable to an increase in displacement.

Set a Mark for Refiners

In selecting the compression ratio for the Chrysler "Red Head" engine they had been doing pioneering and had been working more or less in the dark, but at least they had set a mark for the oil refiners to work to. The maximum compression which could be used satisfactorily depended upon the anti-knock value of the fuel used, upon the volumetric efficiency and upon the temperature at which the charge entered the engine.

While the provision of the higher compression ratio costs nothing, a premium has to be paid on the fuel, but Mr. Macauley said he had been surprised that they had met practically no sales resistance on these cars requiring a higher priced fuel. The higher prices of anti-knock fuels were justified because these fuels permitted better engine performance. The marketing of high compression engines, Mr. Macauley said, was a good thing from the standpoint of the fuel industry, in that it enabled the refiners to get some returns on their outlays for research work on improved fuels. According to the latest records, the Chrysler Corp. has been shipping about 60 per cent of its "80" equipped with the high compression head.

E. D. Herrick, chief engineer of the Lycoming Mfg. Co., said the work his firm had been doing bore out the findings of Mr. James in every respect. The buying public at the present time demands performance at both low and high speeds—and quite high speeds. While his company had done work with higher compression ratios up to 6:1, they felt that many of their engines would be used by people who would object to paying a premium on special fuels, and for that reason they had limited themselves to a compression ratio that permitted of the use of ordinary fuels, and had devoted most of their efforts toward increasing engine performance by improving the volumetric efficiency.

The adoption of a dual inlet manifold and a dual carburetor, together with a slight increase in compression, had permitted of an increase in power output of just short of 30 per cent. The effect of the dual manifold had been unexpectedly great, and dual manifolding was the only thing that had ever come to the speaker's attention that made possible a shifting of the peak of the torque curve (evidently to a higher speed) without a change in timing.

A Plea for Research

Henry M. Crane, of General Motors, said it was a shame that not more was being done along the line of research represented by the paper under discussion. Engineers, under the pressure of their daily work, accepted too many things as definitely settled, as, for instance, that a certain stroke/bore ratio was best. The author of the paper had come from the Bureau of Standards, where they took nothing for granted, and it would be well if there were a little more of that same spirit in the engineering departments of manufacturing concerns.

In the development of the passenger car we had progressed from the four-cylinder engine to the six

and the eight and had finally got as far as the twelve, but we had then realized that we had overstepped reasonable bounds and had given that up some years ago. In England they had only recently brought out a couple of 12-cylinder passenger cars, and yet some people insisted that they were ahead of us in engine design over there.

Referring to some humorous remarks made by Raymond Hitchcock, the actor, earlier in the evening, Mr. Crane said nothing that Hitchcock had said was as funny as the rules under which automobile racing was conducted at Indianapolis. There they put a limit on engine displacement but no limit on engine speed, on the cycle of operation of the engine or on supercharging.

Mr. Crane pointed out that in their endeavor to provide better car performance engineers had constantly increased the size of their cars. This was a mistake, and the real problem was to get better results from the same amount of raw materials. This tendency was particularly noticeable about two years ago and Mr. Kettering at that time had described the situation by saying it was the year of the reamer, the year of enlarged bores.

The paper of the evening had dealt with such characteristics of performance as were readily measured. There were, of course, other desirable features, such as smoothness of operation, and life, for which there was no dependable yardstick. The best way to evaluate these that they had yet discovered was to get the opinions of a large number of men.

The greatest improvement made in recent years in the lower-priced cars was that they were made bigger. It was naturally much easier to get high speed in a larger car, as the wind resistance was such a big factor and the wind resistance area did not change materially with increase in engine power. What we would have to do eventually would be to increase performance without increasing size continually, and if we could no longer do that we would have to admit to the public that we had reached our limit.

Fuel Acts Better in Stock Engines

Neil MacCoull of the Texas Corp. pointed out that fuel knock is most pronounced with a mixture ratio which is about the most desirable from both the power and economy standpoints, and that if the mixture ratio is varied either way from this optimum the knock diminishes. As a consequence fuels generally give better results, from the detonation standpoint, in stock engines than in fuel test engines, which latter are always of the single-cylinder type. In these test engines the mixture is adjusted so as to be very close to the optimum referred to, whereas in a multi-cylinder engine, owing to deficiencies of the manifolding system, the carburetor must be adjusted so some of the cylinders get too rich and some too lean a mixture, in order that none will receive a mixture that will not fire, and this naturally decreases the knocking tendency.

It was also brought out in the discussion that with one and the same fuel the tendency to detonation increases with the temperature at which the charge enters the cylinder. This, it was said, had been pointed out by Ricardo and had been confirmed by tests made in this country. There has been an impression to the contrary among engineers, which is probably based on the observation that with a variety of fuels, poor vaporization is usually accompanied by detonation. It is evidently not a sound conclusion that the two phenomena also parallel each other in the case of one and the same fuel.

AUTOMOTIVE **NEWS SECTION** INDUSTRIES

Philadelphia, Pennsylvania

December 24, 1927

Inventory Period Brings Production to Low Point

PHILADELPHIA, Dec. 24—The holiday season, though bringing a stimulus to automobile retail sales through the increased buying of cars as gifts, likewise ushers in the inventory season in most factories and brings manufacturing operations to the low point of the year. Many companies introducing new models will continue active operations but the majority of factories will be closing for two-week periods.

A much more rapid manufacturing pace will begin in January with the national shows opening the 1928 selling season, but high scale operations will not be effective until February at least. With its announced schedule of 1000 cars daily in January, Ford Motor Co. will take up much of the slack of past months but really high operation in this plant will not be realized much before June according to its plans.

Should Congress act quickly on the revision of the automobile excise tax buyers will have this incentive, added to the attraction of the new cars, for coming into the market promptly. As a price reducing feature this will rank with any action factories might take. Considerable revision is being made in many lines, particularly in cars under \$1,000, to permit of closer competition, but the changes are in chassis and body features rather than in prices.

The general retail situation is good, stocks of both new and used cars being considerably reduced in the past month.

Chevrolet to Present New Line January 1

DETROIT, Dec. 24—It is understood that Chevrolet Motor Co. will announce a complete new line on Jan. 1. The new car will be a spectacular improvement on the present model, according to reports. All details, it is expected, will be available on the first of the year.

Chevrolet assembly plants have been in production of the new car since Dec. 12 and shipments have been under way to dealers since Dec. 15, so that practically all of the entire dealer organization will be prepared for the introductory showing. Cars will be ready for delivery by dealers immediately.

Unofficial reports say the new car will embody many improvements in design and construction and new standards of beauty are promised.

Olds Increases Operations

LANSING, Dec. 22—Employment at Olds Motor Works was increased to 2550 today, exclusive of 1300 working in the Fisher plant on Oldsmobile bodies. The company expects regular production to be under way Dec. 27.

Senate to Rescind Tax, Says Simmons

WASHINGTON, Dec. 22—A prediction that the Senate will approve the House elimination of the 3 per cent excise tax on passenger cars was made this week by Senator F. M. Simmons of North Carolina, ranking minority member of the Senate committee on finance, and Rep. J. Q. Tilson of Connecticut, majority leader of the House. Senator Simmons also predicts, following a conference with President Coolidge, that the President will not veto the revenue measure because it provides a reduction of \$64,000,000 more than Secretary Mellon thinks wise.

Commenting on the automobile tax, Senator Simmons said that he would advocate the elimination from the bill of the automobile and theater admission tax, so-called nuisance taxes. Representative Tilson, while expressing some dissatisfaction over the House measure as finally passed, said that: "So far as the elimination of the automobile tax is concerned I have no complaint whatever, except that by doing so, we have carried the tax reduction nearly \$65,000,000 further than the Secretary of the Treasury thinks best to be safe, and \$33,000,000 further than the ways and means committee recommends."

Provides Conference Funds

WASHINGTON, Dec. 20—A bill providing \$15,000 for American participation in the second Pan-American conference on highways, to be held in Rio de Janeiro, was introduced this week in the House by Rep. Linthicum of Maryland, a member of the foreign affairs committee. The funds will be used to send official delegates to the conference which will be held in June, 1928.

Auto Batt Buys Mason

FLINT, Dec. 21—Standard Auto Batt Co. has purchased the Mason Motor Co. from the Durant interests and will expand its operations, according to O. M. Banfield and E. H. Warren, owners of the company.

Lehigh Valley Starts Container Shipments

NEW YORK, Dec. 19—Effective Jan. 9, the Lehigh Valley Railroad will carry less than carload lots of shipments in steel shipping containers loaded on container cars for delivery by truck at destinations between the following points:

From Buffalo to Newark, N. J., New York, Rochester and Wilkes-Barre. Newark to Boston, Buffalo, Cleveland, Rochester, Springfield, Mass., Syracuse and Wilkes-Barre. New York to Buffalo, Cleveland, Rochester and Wilkes-Barre. Rochester to Buffalo, Newark, New York and Wilkes-Barre. Wilkes-Barre to Boston, Buffalo, Cleveland, Newark, New York, Rochester, Springfield and Syracuse.

M. & A.M.A. Indexes Show Decreases in November

NEW YORK, Dec. 19—The Motor & Accessory Manufacturers Association reports the grand index on automobile parts and accessories production during November as 102, as compared with 129 for October and 81 for November a year ago. The decline since October is attributed to the fact that some of the larger automobile manufacturers were closed down during part of the month for inventory. Resumption of activity on the part of these manufacturers and the reentry of Ford business will bring the index figure for December to a much higher mark, the association believes.

The index figure for original equipment is 99 as compared with 124 in October and 94 in November a year ago. The index figure for accessories is 75 as compared with 103 in October and 83 in November, 1926. Replacement parts are placed at 132 as against 174 in October and 94 last November. Shop equipment index is 143 as compared with 120 in November and 119 in November of 1926.

Truck Merger Under Way

NEW YORK, Dec. 21—Negotiations leading to a merger of several leading truck producers, in which Brockway, Indiana and several others are reported concerned, are continuing and there is possibility of an announcement within a short time, according to a statement by a leading executive of one company.

German Parts Tariff Hits American Plants

Closing of Assembly Operations Seen With Parts on Par With Finished Cars

NEW YORK, Dec. 20—The new German tariff bill raising the rate on automobile parts to the same rate as on finished cars will become effective Jan. 15, and will bring to a stop, according to company representatives, the assembling of American cars in that country. American companies which have been operating assembly plants are Ford, Willys-Overland, General Motors, Hudson-Essex and Chrysler, the total investment being about \$12,000,000.

As operated, these plants gave employment to about 4000 workers. Opposing passage of the bill, American representatives said this work would be stopped, necessarily, as there would be no further advantage in the investment. Supporters of the bill held that assembling cars from parts imported in large quantities at low rates was an evasion of the tariff law. The bill was introduced in the Reichstag by the ministers of finance and commerce though the latter is said to have promised the American assemblers that no change in the tariff bill would be made for two years.

Alfred Reeves, general manager of the National Automobile Chamber of Commerce said:

"It is regretted that so much haste was shown in the passage of this new tariff. It simply means that these American manufacturers must mark up their prices and that the German people will have to pay more for their transportation. A fair consideration of the investment of the American companies would have warranted the effective date being carried over for six months or a year. As time goes on we are sure that the German people will see the advantage of some kind of differential to assembly plants which employ German labor and advance industry in their own country."

Fiat Plans Brazil Plant

WASHINGTON, Dec. 19—The automotive division of the U. S. Department of Commerce is advised by its representative in Brazil that the Fiat company of Italy is planning the establishment of a factory branch in Sao Paulo. Land has already been acquired and it is understood that the factory will be primarily an assembly plant and that the cars will be shipped in bulk and assembled in Brazil.

Lancia Buys Fiat Plant

NEW YORK, Dec. 22—Lancia Motors of America has bought the plant formerly occupied by the Fiat company at Poughkeepsie. The company will import engines, differentials and trans-

missions for assembly into a car which it will build here. The car will be an eight-cylinder model with wheelbase of 120 to 130 in. Capitalization of the company is for \$2,400,000. Vincent Lancia is chairman of the board and Anthony M. Flocker, president. This plant was erroneously reported sold last week to the Larrabee-Deyo Truck Co.

Fokker Production to Start in Spring

NEW YORK, Dec. 19—Fokker Aircraft Corp. of America has been formed with a capital of more than \$1,000,000 and headquarters at Wheeling, W. Va., according to announcement this week. The new company will undertake quantity production of universal and trimotor type planes and will have sole manufacturing rights to Fokker aircraft in the Western Hemisphere.

Anthony H. G. Fokker is associated with the new company as designer and consulting engineer. Lorillard Spencer of New York, president of the Atlantic Aircraft Corp., is president of the new company. The Atlantic Aircraft Corp., with a plant at Hasbrouck Heights, N. J., will be a subsidiary of the new company.

Production of planes for both commercial and government service is scheduled to begin next spring.

Accident Totals Lower in Many Leading Cities

NEW YORK, Dec. 20—Cleveland, Boston and St. Louis show a total of automobile accidents for the first 10 months of the current year below those for the corresponding period of 1926, according to figures made public by the National Automobile Chamber of Commerce based on City Health Department records. Detroit's autumn record indicates that its total for the year will be lower than for 1926. New York, Chicago, Philadelphia and Pittsburgh may possibly keep within their 1926 record if the last few weeks are held down.

Steeldraulic Brake Sought

CLEVELAND, Dec. 21—E. J. Kulas, president of Midland Steel Products Co., reports negotiations for supplying Steeldraulic brakes are under way with three car manufacturers. Production is being increased at Detroit to meet the needs of the companies now using the brake and additional production will soon get under way in Cleveland.

Celoron Gets Contracts

PHILADELPHIA, Dec. 22—The Celoron Co., division of Diamond State Fibre Co., reports contracts from Nash, Chrysler and Chevrolet for their timing gear requirements in the first six months of 1928. Contracts from Marmon and Velie for 1928 also have been received.

Business in Brief

Written exclusively for AUTOMOTIVE INDUSTRIES by the Guaranty Trust Co.

NEW YORK, Dec. 22—Increased public buying for the holiday season has been the principal feature of the business situation in the past week. Retail trade has advanced noticeably despite the tendency for wholesale distribution to lag. Unfilled tonnage of the United States Steel Corp. increased 113,404 tons. Merchandise exports in November amounted to \$461,000,000, while imports totaled \$345,000,000.

FREIGHT CAR LOADINGS

Railroad freight car loadings in the week ended Dec. 3 rose, numbering 915,408, as compared with 840,803 in the previous week and 1,051,219 in the corresponding period a year ago. Total loadings so far this year amount to 49,197,453 cars, as against 50,401,207 cars in the same period last year.

PETROLEUM OUTPUT

Production of crude petroleum increased during the week ended Dec. 10, average daily output for that period being 2,487,500 bbl. which compares with 2,480,750 bbl. a week earlier and 2,396,250 bbl. in the corresponding period a year ago.

FISHER'S INDEX

Professor Fisher's index of wholesale commodity prices receded to 144.3 last week, as against 146.1 in the preceding week and 145.9 four weeks earlier.

BANK DEBITS

Bank debits to individual accounts, as reported to the Federal Reserve Board for the week ended Dec. 14, were 9.1 per cent below the total of the preceding week and 3.8 per cent greater than the amount reported in the corresponding period of 1926.

FEDERAL RESERVE REPORT

For the same period the Federal Reserve banks reported that discounts increased \$51,100,000, open market purchases \$1,000,000, note circulation \$16,900,000 and deposits \$20,700,000. Reserves declined \$35,300,000 and U. S. Government securities \$6,300,000. Member banks reported in this period loans and discounts increased \$13,793,000, investments \$15,741,000, demand deposits \$72,182,000 and borrowings from the Federal Reserve banks \$48,914,000.

Time money and commercial paper rates were fractionally higher last week at 4 to 4½ per cent and 4 to 4½ per cent, respectively.

Elgin Opens New Plant

ELGIN, ILL., Dec. 17—The Elgin Machine Works this week occupied its new modernly equipped factory which will be devoted to the manufacture of engine piston rings, with a daily output capacity of 5000. Products are now distributed through 250 jobbers in the United States and foreign countries.

Plane Travel Costs Range to \$1.50 Mile

Single-Engine Costs Shown
Beginning at 35 Cents—
Multi-Engines \$1 Up

WASHINGTON, Dec. 20—Figures compiled by the Department of Commerce showing cost of airplane travel, up-keep and operation, just published by the Bureau of Aeronautics, show that the cost per mile is 35.28 cents.

These figures are arrived at by the department, based on the use of single engine planes valued at from \$12,000 to \$14,000 each. Figures compiled by various companies range from the lowest of 35 cents a mile up to \$1 a mile for single-engine ships and from \$1 to \$1.50 a mile for multi-engine ships.

The 35 cents a mile figure, furnished by one company, is arrived at as follows:

	Cents a Mile
Pilot	7.5
Mechanic	2.3
Fields (2)	2.6
Depreciation	8.6
Fuel and Oil	5.0
Hangar expense	0.6
Hangar land rent	0.12
Office	4.83
Advertising, selling	2.41
Legal	0.24
Insurance
Pilot	0.60
Plane	0.48

35.28

Figures furnished to the department by the Post Office during 1926 show that the average cost per mile for mail carrying planes was \$1.0877.

Sikorsky Bombing Plane Undergoes First Tests

NEW YORK, Dec. 17—The Guardian, a new bombing plane manufactured by the Sikorsky Mfg. Co. in conjunction with the Consolidated Aircraft Corp., received its first test flights at Curtiss Field this week. The plane took off in less than 600 yards and landed at less than 45 miles an hour.

Two Pratt & Whitney Wasp type engines, giving 1050 hp. are used. A speed range of 85 miles an hour from a low flying speed of 55 to a top speed of around 140 miles an hour is estimated. The upper wing has a spread of 101 ft. and the lower wing 58 ft. It has a cruising radius, with its permanent tanks filled, of 600 miles, and can be equipped with auxiliary tanks to carry 5000 miles.

Bellanca Builds New Plane

NEW YORK, Dec. 17—G. M. Bellanca has been working for some time on a mystery ship which, it was revealed last night, is designed for a non-stop New York-to-Rome flight. The new ship, it was said, has a wing spread of 62 feet and is powered with

1927 Plane Output Shows Large Gains

WASHINGTON, Dec. 20—Preliminary figures compiled by the Department of Commerce on airplane production in the United States for the current year indicate a production far exceeding that of any previous year. With but one-third of the manufacturers having sent in their production figures for this year, the incomplete figures show a total of 1525 planes already produced, with 1239 unfilled orders now with the manufacturers, compared with a production for 1926 of 1186 planes.

a Pratt & Whitney 425 hp. Wasp engine. Fuel tanks are built to hold 871 gal. of gasoline, sufficient to sustain the plane any distance up to 6000 miles. The plane has retractable landing gear which can be pulled up into the fuselage to lessen head resistance.

Fairchild Forms Company to Consolidate Interests

NEW YORK, Dec. 17—To consolidate his various aviation interests, Sherman M. Fairchild has formed a holding company, the Fairchild Aviation Corp. of Delaware, with a paid in capitalization of \$1,553,550. Mr. Fairchild is president of the new company, Robert Law, Jr., is chairman of the board, and directors include Governor J. H. Trumbull of Connecticut, and G. H. Townsend, president of the Moto Meter Co., Inc.

In discussing his plans, Mr. Fairchild said that the engine company would continue to manufacture the four-cylinder air-cooled 135 hp. cam type engine. Designs have been completed for an 80 hp. motor of the same type and experiments are being conducted to develop the present engine by adding multiple banks to an 800 hp. 16-cylinder engine for use on large transport planes. The airplane company will continue to manufacture its cabin monoplane and construction has been started on a six-passenger amphibian. The company plans to add two or more new types to its production line in 1928.

Thompson Gets Contracts

CLEVELAND, Dec. 19—Prediction that one-third of the new business obtained by Thompson Products, Inc., of Cleveland in the next two years will be founded on the airplane industry is made by L. M. Clegg, general sales manager of the company. Mr. Clegg returned to the home office in this city with two large orders for airplane engine valves from the Pratt & Whitney Aircraft Co., and the Wright Aeronautical Corp.

Employment Gains Reported by Plants

Department of Labor Reports
Material Increases in Industrial Centers

WASHINGTON, Dec. 19—A material increase in employment in the automobile industry during December is predicted by the Employment Service of the Department of Labor, based on telegraphic reports showing employment conditions throughout the country as of Dec. 10.

Curtailment during November in the automobile industry was reported from practically all manufacturing centers. Allied industries such as plants manufacturing accessories, tires and tubes are also expected to show a material gain during this month. Large orders are reported placed by automobile manufacturers with iron and steel plants and an increase in both production and employment is anticipated during the next 30 days. Following is a summary of the telegraphic reports from the principal automobile manufacturing centers:

Michigan—Considerable unemployment on Dec. 1, largely due to curtailed production in the automobile industry. However, increased operations are expected in the next 30 days. There has been a general slowing up in all foundries and many of the larger automobile manufacturing plants.

Detroit—The Ford company expects to be in full production by the middle of December. Other plants all running, but not all with full force.

Flint—Curtailed schedules continued during November in automobile foundries resulting in slight surplus of labor.

Racine—Automobile factories, foundries, and plants, manufacturing automobile parts, were operating on part-time schedules at the close of the month.

Cleveland—Automobile factories curtail their forces slightly.

Toledo—A surplus of skilled and unskilled labor, particularly in the automobile industry. Several automobile factories are operating on part-time schedule.

Akron—Factories manufacturing tires and tubes recalled many workers during the month.

Germany Seeks Support for Aircraft Exhibition

BERLIN, Nov. 28 (by mail)—Diplomatic representatives in Germany were appealed to by the German minister for traffic, Dr. Koch, to enlist the support of their countries for the international exhibition of commercial aircraft which will be staged in Berlin next October.

Under the plans of the Association of German Airplane Builders there will be five groups of exhibits, the aircraft building industry, air traffic, pilots, scientific department and historical department. It is hoped that leading manufacturers in all countries will participate.

Schwab Says 1928 to End Hard Times

Stutz Convention Hears Noted
Leader—Moskovics Out-
lines Coming Year Plans

INDIANAPOLIS, Dec. 19—Charles M. Schwab, addressing the annual sales convention of the Stutz Motor Car Co. of America, Inc., told dealers they had passed the peak of hard going and that next year he would congratulate them in more hearty terms than ever before. He praised the company and its management and told the dealers they had the best automobile ever built to sell.

Following short talks by F. E. Moskovics, president, Eugene V. R. Thayer and Carl Schmidlapp, the assembly heard radio greetings from Lee Foo, Hong Kong, China distributor for Stutz and from Warwick Wright, London distributor.

Dealers were shown through the Weymann body plant and taken to the Speedway for several events. Demonstration laps were run off by George Spindler, Indianapolis Stutz distributor, and Richard Watney, member of the firm of Warwick Wright, Ltd., London. Several short stock car races were held and the Pak-Age-Car was shown on the track.

Tuesday sessions were given to discussions of the mechanical features of the 1928 Stutz line by Bert Dingley, service manager, and Charles S. Crawford, chief engineer, the trend in colors, by J. P. Conolly, sales and advertising programs by Col. E. S. Gorrell and Glen Buck, and a safety talk by Victor T. Noonan, director of public safety, Chicago Motor Club. C. Alfred Campbell, sales development manager, spoke on sales policies.

Mr. Moskovics spoke on selling the Weymann line and J. J. Marshall of the Melchior Armstrong Dessau Co. discussed The Stutz Overseas. The Stutz in England was the topic of Mr. Watney's discourse and Colonel Gorrell presented the outline of a budget plan.

Present Pak-Age-Car Officials

Pak-Age-Car officials, including Walter J. Dukes, acting president, Lee Oldfield, chief engineer and A. A. Lau, sales manager, were presented formally to the assembled Stutz representatives who will distribute the products of this company.

A second banquet was given Tuesday evening with Colonel Gorrell as toastmaster and Capt. E. V. Rickenbacker, chairman of the American Automobile Association contest board and principal owner of the Indianapolis Speedway, the speaker.

Wednesday sessions took up the Pak-Age-Car production and sales plan in detail, followed by a general sales discussion and a discussion of the service policies and methods of mechanical demonstration.

Ford Works Toward 1000 Day Schedule

DETROIT, Dec. 17—The Ford Motor Co. continues to take men back to work, employment figures reveal. There are now 78,830 men at work in the Fordson and Highland Park plants of the company, an increase of 8000 since Dec. 5. Of this number, 54,516 are working in the Fordson plant and 23,314 are at Highland Park. While the company has given out no figures showing production progress with the new Ford car, it is understood that the output is being increased gradually and the company expects to be in a position to meet its proposed schedule of 1000 cars a day by Jan. 1.

Chandler Adds 3 Cabriolet Models

CLEVELAND, Dec. 19—Chandler Motor Car Co. has added cabriolet models to its Royal Eight, Big Six and Special Six lines and has added a new five-passenger sedan in its Special Six line. The price on the five-passenger sedan in the Big Six line has been reduced from \$1,795 to \$1,695. In the Special Six line the new five-passenger sedan lists at \$1,065 against \$1,135 formerly.

The complete Chandler line for 1928 has a selling range from \$995 for the Special Six sedan and touring car to \$2,195 for the Royal Eight seven-passenger sedan.

In the Special Six line greater speed has been achieved through the adoption of a larger engine with a bore and stroke of 3½ by 4¼.

American Vehicles 95% of Iceland Registration

WASHINGTON, Dec. 20—Despite the climate, automobiles and trucks are displacing pack horses in Iceland, according to a report to the automotive division of the Department of Commerce. Registration on June 30, according to the figures furnished the government, was 600 vehicles, of which 300 are in Reykjavik. Of the total registration, 95 per cent are American cars. The country is without a railroad but has 2000 kilometers of highway.

Fisher Plant Resumes

DETROIT, Dec. 19—The Fisher Body Co. plant at Lansing, manufacturing and finishing bodies for the Olds Motor Works, resumed work today, putting 1300 men back to work. It is expected that by Jan. 1, another 400 will be added.

Hupp Fixes Limits of Dealer Expansion

Will Avoid Overcrowding to
Provide Adequate Oppor-
tunity for Sound Sales

DETROIT, Dec. 19—With an addition of 186 new dealers since Nov. 1, Hupp Motor Car Corp. will continue to increase its dealer organization only to the point where the whole territory is adequately covered to market the product, according to R. F. Cole, general sales manager. The intention is to give each dealer enough territory to develop a good business and make a satisfactory profit, he said.

No attempt will be made to force the market, Mr. Cole said. Every dealer will get all the cars he can sell profitably and no more. Dealers will have more opportunity to prosper than if they were overloaded and will be given all the factory cooperation possible in avoiding losses through bad deals. This policy, with a vigorous factory selling campaign behind it, will give Hupp dealers unusual profit opportunities in 1928.

To assist in the enlarged sales program, F. D. Peabody, who has been district sales manager in the Northwest, has been brought to the factory as assistant general sales manager. Appointments of district sales managers made recently include J. W. Upson, Southern States; George R. Lipe, Northwest; A. G. Millard, Canada; F. E. Kennedy, Eastern States; J. J. Mich, northern New York and Pennsylvania; F. D. Phillips, Ohio and Indiana; A. M. Colgrove, Chicago; G. H. Wright, Southern States; H. L. Winter, Texas and J. E. Roberts, Northwest.

Mr. Cole also announced the appointment in recent months of 24 new Hupp mobile distributors.

New Stutz Racing Car to Develop 220 m.p.h.

ROCKFORD, ILL., Dec. 17—Fred E. Moskovics, president of the Stutz Motor Car Co. of America, Inc., this week revealed some plans of the design of the Stutz racing car which Frank Lockhart is supervising at the Stutz plant and which is expected to develop 220 miles an hour. The machine is being built to bring down the record now held by Frank Segraves' "Mystery S" British-made car, which did 203.7 miles at Daytona Beach.

The Stutz machine will be a radical departure from the British type with its four big engines and Goliath build. In direct contrast the Stutz car will have but one engine with a piston displacement even smaller than the Ford, developing 240 hp. Several important developments in airplane fuselage and automobile design will be embodied in the Stutz and the speed will not depend upon weight. Lockhart will be chief of the racing team.

Men of the Industry and What They Are Doing

Munn Reynolds President, Reynolds Named Chairman

Wiley R. Reynolds has resigned as president of Reynolds Spring Co. and has been named chairman of the board of directors. He is succeeded as president by Charles G. Munn of Detroit, who is also named to the board. William Woodside of Detroit was elected a director to fill a vacancy. Mr. Reynolds issued a statement denying that the company was to be sold to General Motors Corp. or any other interests and said it would continue to be operated as a separate and distinct concern.

Rawson Now With Moon

R. A. Rawson has been appointed assistant general sales manager of Moon Motor Car Co. Mr. Rawson has been identified with many leading automobile producers in a sales capacity, recently serving as sales manager of Elcar. In 1923 he joined Franklin Automobile Co. and a year later became manager of merchandising for Stutz and later vice-president of the company's Indianapolis branch.

Sargent Joins Chromium

George J. Sargent, widely known as an expert on the electro-deposition of chromium, has been appointed to the technical staff of United Chromium, Inc. Mr. Sargent has been associated as a research chemist with Michigan Smelting & Refining Co., Connecticut Metal & Chemical Co., and Dodge Brothers, Inc.

Cavalli Leaves Fiat

Head of the designing and experimental department of the Fiat company for more than 20 years, Engineer Cavalli has resigned and has been succeeded by Engineer Zerbi, who for several years had been his assistant and was largely responsible for the development of the first Fiat supercharged racing engines.

Swiss With Indiana Truck

Herbert H. Swiss has been appointed export manager of the Indiana Truck Corp. with headquarters at the factory in Marion, Ind. Mr. Swiss was formerly export manager for Republic Motor Truck Co. and later with the Ruggles Motor Truck Co. and has a wide acquaintance among dealers in the export field.

Gary Leaves Autocar

H. R. Gary has resigned as assistant sales manager of the Autocar Co., to enter business in Boston. Mr. Gary had been connected with Autocar since 1922. Before promotion to sales work at the factory, Mr. Gary was manager of the New England district for Autocar.

Jardine Speaker at N.A.C.C. Show Dinner

William M. Jardine, Secretary of Agriculture, has been chosen as the principal speaker at the annual dinner of the National Automobile Chamber of Commerce to be held in connection with the New York Automobile Show, Tuesday night, Jan. 10, at the Commodore Hotel. Secretary Jardine will speak on Cooperation Between Industry and Agriculture.

Frisbie Joins U. S. Chamber

The Chamber of Commerce of the United States has announced the appointment of J. B. Frisbie, as assistant manager of the chamber's foreign commerce department. For the last four years Mr. Frisbie has been secretary of the American Chamber of Commerce of Cuba. Previous to that time, he was connected with the foreign service of the National City Bank of New York in Argentina and Cuba.

Hastings Heads Committee

Roy D. Chapin, president of the National Automobile Chamber of Commerce, has announced the following service committee: Charles D. Hastings, Hupp Motor Car Corp., chairman; J. E. McLarty, Hudson Motor Car Co.; H. C. Marble, White Motor Co.; W. M. Warner, Cadillac Motor Car Co., and F. J. Wells, Pierce-Arrow Motor Car Co.

Cosford Succeeds Galer

E. J. Cosford has succeeded C. H. Galer as assistant sales manager of the Studebaker Corp. of Canada, Ltd. Mr. Galer has been promoted to sales manager of the Studebaker Corp. of Great Britain, Ltd.

Mekeel Joins Nugent

Van Cortright Mekeel, formerly connected with the Taylor-Wharton Iron & Steel Co., High Bridge, N. J., has resigned to join the Nugent Steel Castings Co., Chicago, as special representative.

Higbie Reo Director

C. M. Higbie of Detroit, has been elected a director of Reo Motor Car Co., increasing the directorate to eight members. All officers and other directors were reelected.

Treaster Succeeds Pearce

F. A. Treaster, secretary of the Peerless Motor Car Corp., has been elected treasurer, succeeding A. L. Pearce, who resigned, and he will fill both positions.

Hurd Promotes Ingraham and Names District Men

Lee H. Ingraham, district manager of E. P. Hurd, Detroit manufacturer of pin tumbler cylinders, padlocks and spare tire locking devices, has recently been recalled to Detroit and promoted to sales manager.

Mr. Ingraham states that the company is anticipating putting on the market several new products, including a very efficient spare tire locking device for the new Ford, and that they have added to their sales organization in the field. The company announces the following field representation:

Michigan, Indiana, Ohio, Kentucky and West Virginia, H. F. Griffin, Cincinnati; Eastern territory, Arkay Co., New York City; Southeastern territory, Darling & Nevins, Atlanta; Wisconsin and Illinois, Roy Weldon, Chicago; Southwestern territory, Bert Mosher, Kansas City; Pacific Coast territory, Arthur E. Mohrig, San Francisco.

Rodger Heads Detroit Boosters

David W. Rodger, general sales manager of the Federal-Mogul Corp., has been elected president of the Automotive Boosters Club, No. 19, of Detroit. Other officers elected are Walter Leitheiser, vice-president; R. L. Brown, secretary, and A. R. Sandt, treasurer. Directors elected are R. C. MacFee, T. Sawyer, A. R. Sandt, O. H. Leidy, Floyd Adams, C. H. Davis, C. F. Adams, Charles Ward, W. Leitheiser, Harry Burr, R. L. Brown and D. W. Rodger.

Ahrens Succeeds Cook

Don E. Ahrens, who has been manager of the Cadillac Motor Car Co. branch in Evanston, Ill., has been named manager of the Philadelphia branch succeeding Ralph W. Cook, who has retired. Mr. Ahrens entered the industry in 1916 as a dealer at Topeka, Kan. Following the war he became Cadillac distributor at Spokane and in 1926 joined the Chicago branch, later becoming manager at Evanston.

Grace Joins World Bestos

Joseph Grace has become associated with World Bestos Corp. and will handle the sale of Grafil in the metropolitan area. Mr. Grace is well known in the automotive industry, having represented some of the leading parts makers for several years past.

Walton Heads McAleer Sales

Tom Walton, well known in automotive sales circles, has been named general sales manager of C. H. McAleer Mfg. Co., makers of automobile polishes. Mr. Walton, until recently, was sales manager of E. P. Hurd, manufacturer of spare tire locking devices.

Federal Bus Bills Set Up Two Classes

Would Regulate Interstate Operations Over Both Fixed and Irregular Routes

WASHINGTON, Dec. 22—Federal regulation of buses used in interstate traffic is provided for under two identical measures just introduced into Congress, one by Senator James E. Watson of Indiana, and the other by Rep. Edward E. Denison of Illinois.

The salient features of the bills divide interstate bus traffic into two classes. The first, known as Class A motor carriers, governs interstate traffic between fixed terminals over designated and regular routes. Class B motor carriers covers all other interstate bus movements. Neither measure affects interstate truck movement. Operators desiring certificates, to enable them to operate interstate, must first secure same from the Interstate Commerce Commission or from a state board authorized to issue such permits. This application must contain full data as to financial liability, the designated route, the need of such service, and show what other companies, if any, it will compete with. Unless there is a need for the service, the bills authorize the state board or the I.C.C. to refuse the application. Certificates authorizing operation of lines may be transferred.

A bond, payable to the United States, must be provided to insure persons killed or injured by the bus line. This provision, however, may be waived by the board or commission where the proposed bus operator can establish his financial liability to meet any claims that might arise against him. The crux of the 25 page bill, however, is section 10, which gives the Interstate Commerce Commission authority to fix rates and make such regulations as may be necessary governing interstate bus lines. All rates, fares, and charges of the carrier must be printed and filed with the state board and the Interstate Commerce Commission and posted in practically the same manner as the railroads are required to publish and post their rates. No change in rates may be made either up or down without the specific authority from the commission.

Use Uniform Account System

Section 11 of the measure provides that the commission must promulgate uniform systems of accounts to be used by all motor carriers, and regulate every motor carrier, requiring them to provide continuous and adequate service at just and reasonable rates. Several sections of the bill are devoted to administrative features and outline the duties of the state boards and provide for an appeal from a decision of the state board to the Interstate Commerce Commission. The final section of the bill makes it a Federal offense for a bus

Eleven Months' Total Shows 892,895 Decrease

1926			
	Cars	Trucks	Total
Jan. ...	289,612	35,411	325,023
Feb. ...	339,883	43,134	383,017
Mar. ...	405,559	51,282	456,841
Apr. ...	407,762	55,046	462,808
May ...	396,746	49,367	446,113
June ...	362,526	47,125	409,651
July ...	332,641	41,842	374,483
Aug. ...	395,429	46,437	441,866
Sept. ...	364,826	48,356	413,182
Oct. ...	303,157	45,934	349,091
Nov. ...	229,193	36,935	266,128
Total...	3,827,334	500,869	4,328,203
Dec. ...	145,902	29,772	175,674
Total...	3,973,236	530,641	4,503,877

1927			
	Cars	Trucks	Total
Jan. ...	211,395	42,907	254,302
Feb. ...	278,997	44,411	323,408
Mar. ...	365,634	52,033	417,667
Apr. ...	377,899	51,449	429,348
May ...	379,139	50,666	429,805
June ...	295,198	45,956	341,154
July ...	245,585	33,871	279,456
Aug. ...	284,489	36,819	321,308
Sept. ...	235,121	36,519	271,640
Oct. ...	189,177	38,224	227,401
Nov. ...	114,076	25,743	139,819
Total...	2,976,710	458,598	3,435,308

operator to operate interstate without first obtaining the necessary certificates, or charter.

The bills specifically reserve to the states authority to regulate intrastate business on the highways of any state. Hearings on the two measures will be heard respectively before the House interstate commerce committee and the Senate interstate committee after the holiday recess. It is regarded as likely, however, that the hearings will be merged with those to be introduced later which will embody the recommendations of the Interstate Commerce Commission.

Robert McAllister Lloyd

NEW YORK, Dec. 17—Robert McAllister Lloyd, who had a prominent part in the early development of the storage battery and the storage battery vehicle in the United States, died here Dec. 14, at the age of 64. After having been associated with the Electric Storage Battery Company of Philadelphia, in 1901 he organized the Vehicle Equipment Co., which later changed its name to General Vehicle Co., manufacturer of electric trucks. During the war this company took up the manufacture of Gnome aircraft engines. Mr. Lloyd also was president of Mantle & Co.

Mr. Lloyd was born in Philadelphia and was educated at Germantown Academy and Lehigh University. He was a member of the American Institute of Electrical Engineers and the Society of Automotive Engineers.

November Production Reduced to 139,819

Output of About 15,000 by Ford is Indicated—N.A.C.C. Output 125,300

WASHINGTON, Dec. 21—Car and truck production in the United States and Canada, totaled 139,819 in November, according to the Department of Commerce. Production by members of the National Automobile Chamber of Commerce was approximately 125,300, which would indicate a production of about 15,000 for Ford Motor Co. and other non-member companies during the month.

Production for the 11 months of 1927 is brought to 3,435,308 which compares with 4,328,203 in the first 11 months of 1926. Passenger car production in the United States in this period was 2,832,117 against 3,668,903 in 1926; truck output was 427,200 against 461,960. Canadian passenger car output for the first 11 months was 144,593 against 158,431 in 1926, and truck output was 31,398 against 38,909.

Passenger car and truck outputs in the United States in November were 108,903 and 24,299 respectively, and Canadian passenger car and truck outputs for the month were 5173 and 1444. October U. S. productions, respectively, were 182,941 and 36,669, and Canadian, 6236 and 1555. In November last year, passenger cars and truck outputs in the United States were 222,419 and 33,881, respectively, and in Canada, 6774 and 3054.

Comparison of production by months for this year and last is shown in an accompanying column.

Pierce-Arrow to Present

New 1½ to 2 Ton Model

BUFFALO, Dec. 21—Pierce-Arrow Motor Car Co. will announce at the New York automobile show a new commercial car for fast delivery of loads ranging from 1½ to 2 tons. The model will be powered with a 75 hp. six-cylinder engine and will have four-wheel brakes. Three wheelbase lengths will be offered, 140, 160 and 180 in. The model will be known as the Fleet Arrow and is priced at \$2,450 for the standard chassis.

Michael O'Neil

AKRON, Dec. 19—The rubber world is grieving the death of Michael O'Neil, former president and chairman of the board of General Tire & Rubber Co. The present success of General as evidenced by its recent declaration of increased regular and extra cash dividends was due in a great measure to Mr. O'Neil. His son William is now president of the company, the elder O'Neil relinquishing the chair three years ago. He was 77 years old and died of influenza.

Two German Makers Form Combination

N.A.G. Absorbs Prestowerke
on Exchange Basis—Makes
Cars and Trucks

BERLIN, Nov. 30 (by mail)—The Nationale Automobilgesellschaft Aktien-gesellschaft (N.A.G.) in Berlin, has absorbed the Prestowerke Aktiengesellschaft in Chemnitz, the shareholders of the latter receiving 500 marks of new N.A.G. shares for every 400 marks of the old Presto shares. The N.A.G. company belongs to the leading Continental electric concern, the Allgemeine Elektrizitäts-Gesellschaft, and was founded in 1901 as the Neue Automobilgesellschaft m.b.H. It has a capital of 10,000,000 marks and employs about 2000 workers and officials. Last year this company absorbed the Protos company founded in 1906 by the Siemens electric company.

Prestowerke has a capital of 3,000,000 marks and 45,000 marks of preference shares. It employs 2200 workers and officials and only a few months ago absorbed the Dux works of Leipzig. N.A.G. specializes in heavy utility vehicles, the Protos department, however, was carrying on with passenger cars. The Presto works mainly build passenger and delivery cars, same as Dux.

New Belgian Group Combines Interests

BRUSSELS, Dec. 4 (by mail)—International competition on the Belgian market is particularly keen at present, the two greatest rivals being France and the United States. Protected at home, the French makers here receive the full blast of American competition for they are on an equality in the matter of import duty, they have an adverse 40 per cent against them in exchange rates and they have to compete against cars with a lower factory selling price. With a few exceptions Belgian makers are being crushed by this double competition on their home market and several of them have quit the passenger car field for truck construction, as being less competitive.

There is a growing opinion among Belgian makers that they must unite if they are to survive foreign competition. The most important step in this direction is a pact between Minerva and F. N.

Another group has been formed of Imperia, Metallurgique, Excelsior and the Matthys & Osy Body Co. It is believed that Nagant will later join this group. All these firms are much smaller than Minerva and F. N. and do not produce competitive types. The Metallurgique factory has been sold to Minerva, but some of the machinery has been taken over by Imperia.

French 1927 Output Estimated at 190,000

WASHINGTON, Dec. 20—Automobile production in France for the calendar year, 1927, is estimated to be 190,000 units, according to preliminary figures furnished the automotive division of the Department of Commerce. American manufacturers will sell during the present year in France a total of 1500 passenger cars and trucks, it is estimated.

Europe Seeks Plan to Protect Markets

NEW YORK, Dec. 11—A move looking toward the protection of European automobile industries from the competition of the American industry was discussed at a recent meeting of the Federation of Automobile Manufacturers' Association, the so-called Bureau Permanente. The matter is commented on as follows in the *Berliner Zeitung*:

"The suggestion was made by the Italian delegate, Director Nanny (Isotta-Fraschini). He emphasized that what he proposed was not a fight but a peace measure, which might possibly be worked out in the form of mutual voluntary allocation of import markets. The same topic was discussed later on between German and Italian representatives. From the standpoint of the German automobile industry it is of particular importance that the menace of American competition is being recognized.

"In this connection it must be remembered that Fiat is not represented in the manufacturers' association, and, therefore, not in the federation; but, like Ford, occupies the position of an outsider. At the present time commercial treaties prevent any Inter-European agreement with respect to tariff duties, for, as a result of the most-favored-nation clause the United States also would benefit from any reduction in duties, the purpose of which would therefore be defeated."

Voran Sells Drive Design

BERLIN, Nov. 30 (by mail)—The Voran company of Berlin has sold the license rights for its front drive design to a French maker. The drive is unusual in that three universal joints are employed on each half of the driving axle.

Danish Show Date Set

WASHINGTON, Dec. 20—The second annual automobile show in Denmark will be held in Copenhagen from Feb. 23 to March 4, the automotive division of the Department of Commerce is advised.

Automobile Demand Increases in Mexico

Dealers Reported Placing
More Orders Than Ever Be-
fore—Truck Use Grows

MONTEREY, MEXICO, Dec. 17—More orders for automobiles are now being placed by dealers in Mexico than ever before. The same is true as to trucks. During the month of November approximately 60 carloads of automobiles entered Mexico through the Laredo gateway, each car containing an average of five automobiles. Imports aggregating 900 automobiles were received through other ports.

An unusually large demand for automobiles is now being manifested in all the larger cities of the country. One of the factors that is causing this increase in the sales of automobiles is the construction of good roads. This is especially true of the territory around Mexico City. Modern highways now radiate from the capital in several directions. While the trunk highway that runs from Mexico City to Laredo is not as yet completed, it is in a fairly good condition.

In addition to the early resumption of operations of the assembling plant of the Ford Motor Co., plans are reported under consideration by Dodge Brothers, Inc., for the establishment in Mexico City of an assembling plant.

Motor trucks are now being used by practically every industry and mercantile establishment in the larger cities of Mexico, and this form of transportation is being rapidly extended to the mining camps and other isolated parts of the country. It is in the oil fields adjacent to Tampico that the heavier type of trucks are being generally used.

Finnish Imports in 1928 to Increase to 10,000

NEW YORK, Dec. 17—Imports of motor vehicles into Finland during the current year are estimated at 8000 by J. E. Tuokkola, president of the Finland Automobile Dealers' Association, who discussed trade conditions at a luncheon tendered by the National Automobile Chamber of Commerce.

A low import duty of 8½ per cent ad valorem and low motor taxation, averaging little more than \$10 per vehicle per year, coupled with inadequate railway service are contributing factors to this large importation. Total motor registration on Jan. 1, 1927, was placed at 17,741 by Mr. Tuokkola. He feels that 10,000 motor cars, buses and trucks should be imported during 1928.

To Sell Truck Plant

NEWARK, OHIO, Dec. 19—The real estate and buildings of the American Motor Truck Co. here will be sold at receiver's sale, Jan. 28.

Los Angeles S.A.E. Studies Tire Wear

Adjustment of Camber of Front Axle Held Most Important for Correction

LOS ANGELES, Dec. 17—The importance attached to the subject of premature tire wear, as caused by improper wheel alignment, was given striking emphasis at the last meeting of the Los Angeles section of the Society of Automotive Engineers. With wheel alignment as the sole subject of discussion, the largest crowd in the history of the local chapter turned out and the length of the meeting was extended by popular vote.

The principal speakers of the evening were F. W. Stavely, of the engineering department of the Firestone Tire & Rubber Co.; J. S. Bushey, president of the J. S. Bushey Co., and J. E. Van Sant, service manager of the Paul G. Hoffman, Studebaker distributor of southern California.

How to effect proper wheel alignment and stop premature tire wear which is bringing increasing complaint from users of all classes of motor vehicles was variously answered. Mr. Van Sant, as spokesman for the car distributor, was opposed to any adjustments to the front axle on the ground that it changed the manufacturers' specifications, and that this was dangerous practice. He laid stress on his contention that failure to have tires properly inflated is one of the principal causes of premature wear. On the other hand, Mr. Stavely, who read a paper prepared by J. E. Hale, head of the development department of the Firestone company, declared that in exhaustive tests made by Firestone engineers, the tires were properly inflated at all times and yet various kinds of faulty tread wear resulted.

In reviewing the servicing of more than 24,000 vehicles by his organization, Mr. Bushey declared that in nearly every instance it was necessary to adjust the camber of the front axle in order to permit the weight of the vehicle to be equally distributed over the wheels and tires.

"This adjustment is invariably made cold," he said, "in accordance with the emphatic endorsement of axle manufacturers. 'After making a series of tests on thousands of cars from vertical up to as much as 1 1/4 in. in each wheel, we have obtained the best results on 18, 19, 20 and 21 in. wheels by adjusting the camber in the front wheels from 1/2 in. to 3/4 in. in each wheel, and from 1/16 in. to 1/8 in. toe-in.

Builds Engineering Unit

DETROIT, Dec. 17—Chrysler Corp. has begun construction of a new building at the Highland Park plant to house the engineering department. The

Meetings and Events Scheduled for Week of New York Automobile Show

FRIDAY, JAN. 6

Stutz Motor Car Co. of America, Inc., Salesmen's and Dealers' Meeting, Branch Office 8.00 p. m.

SATURDAY, JAN. 7

Hupp Motor Car Corp., every day, Commodore Hotel.
Studebaker Corp. of America, Dinner, Hotel Plaza 7.00 p. m.

MONDAY, JAN. 9

American Automobile Association, Contest Board, Roosevelt Hotel 10.00 a. m.
National Automobile Dealers Ass'n, Eastern Districts Convention, Commodore Hotel 10.00 a. m.
Oakland Motor Car Co., Meeting, Roosevelt Hotel 1.00 p. m.
Banquet, Roosevelt Hotel.. 6.30 p. m.
Rubber Association of America, Inc., Meeting and Luncheon, Commodore Hotel 10.00 a. m.
Dinner, Commodore Hotel. 7.00 p. m.
Society of Automotive Engineers, Metropolitan Section Auto Show Meeting, Commodore Hotel.
John N. Willys' Luncheon to Trade and Newspapermen, Biltmore Hotel 12.30 p. m.

TUESDAY, JAN. 10

American Automobile Association, Board of Directors Meeting, Roosevelt Hotel.. 10.00 a. m.
National Association of Automobile Show and Association Managers, Luncheon, Waldorf-Astoria 1.00 p. m.
National Automobile Chamber of Commerce Banquet, Commodore Hotel 6.30 p. m.
Packard Motor Car Co., Meeting and Luncheon,

Packard Distributors and Dealers, Biltmore Hotel, 9.00 a. m. to 5.00 p. m.

WEDNESDAY, JAN. 11

American Automobile Association, Bus Division, Roosevelt Hotel 10.00 a. m.
Auburn Automobile Co., Luncheon, Commodore Hotel 1.30 p. m.
Cadillac Motor Car Co., Dinner, Hotel Astor..... 7.00 p. m.
Chevrolet Motor Co., Business Meeting, Mecca Temple 1.30 p. m.
Banquet, Commodore Hotel 6.30 p. m.
H. H. Franklin Mfg. Co., President's Luncheon, Commodore Hotel 1.00 p. m.
Gardner Motor Co., Luncheon and Meeting, Hotel Belmont 1.00 p. m.
Motor & Accessory Manufacturers Ass'n, Annual Meeting, Hotel Astor..... 2.30 p. m.
Banquet, Hotel Astor..... 7.00 p. m.
Olds Motor Works, Annual Banquet, Hotel Commodore.
Packard Motor Car Co., Meeting and Luncheon, Packard Distributors and Dealers, Biltmore Hotel.. 9.00 a. m. to 5.00 p. m.

Paige-Detroit Motor Car Co., Luncheon, Roosevelt Hotel..... Noon
Peerless Motor Car Corp., Dinner, Commodore Hotel. 6.30 p. m.

THURSDAY, JAN. 12

Overseas Automotive Club, Dinner, Hotel Astor..... 6.30 p. m.
Society of Automotive Engineers, Dinner, Hotel Astor 6.30 p. m.
Vellie Motors Corp., Luncheon and Business Meeting, Commodore Hotel 1.00 p. m.

building will include offices for the engineering executives and will also provide improved facilities for automotive research, experiments and tests. The building will be 60 x 400 ft. of four stories, and designed for a fifth floor to be added when further expansion is required.

Buy International Aircraft

CINCINNATI, Dec. 19—The International Aircraft Corp. of Long Beach, Cal., has been bought by three local business men and will be housed here by Feb. 1. Officers of the new company are headed by C. E. Ogden, president. Capitalization is \$500,000. Edwin M. Fisk, chief engineer, will remain after the reorganization.

Dole Valve Moves Office

CHICAGO, Dec. 19—Dole Valve Co. has removed its Detroit office to the General Motors Building, where it is represented by Gay Hall, formerly of Westinghouse Electric & Mfg. Co., and I. S. Lutz.

Reo Adds \$995 Model to Speed Wagon Line

LANSING, Dec. 19—Reo Motor Car Co. has added the Speed Wagon Tonneau to its truck line, priced at \$995. The model has a 123 in. wheelbase, is powered by a six-cylinder engine and is equipped with four-wheel internal hydraulic brakes. Four body types are available. The engine is rated at 25.2 hp., is of L-head type with a bore and stroke of 3 1/4 x 4 in. giving a displacement of 199 cu. in. Pistons are aluminum alloy. The crankshaft carried in seven bearings is 2 1/2 in. diameter.

Push Metric System Bills

WASHINGTON, Dec. 17—Senator Gillett, of Massachusetts, will reintroduce his bill to supplant the present system of weights and measures with the metric standard at the present session of Congress, he announced this week. A similar measure will be sponsored in the House by Representative Britten, of Illinois.

Parts Standardizing for Trucks Proposed

Pennsylvania S.A.E. Speaker
Says Plan Would Benefit
Vehicles in Service

PHILADELPHIA, Dec. 21—The December meeting of the Pennsylvania Section of the Society of Automotive Engineers was devoted to the general subject of maintenance with particular reference to the effect of vehicle design upon servicing problems.

J. G. Moxey, supervisor of motor vehicle transportation of the Atlantic Refining Co., stressed the necessity for a higher degree of standardization in truck designs and for more complete interchangeability of parts among various models of the same make of truck. With complete interchangeability of parts, he said, it would be possible for truck owners to keep their equipment up to date by installing newly designed parts and equipment as they are brought out by the factory.

Economical transportation demands constant and efficient service from trucks, he said, and since it is unwise to operate obsolete designs this method of permitting modernization of old models would be particularly advantageous to operators.

Carroll McShane, service manager of the Jordan-Philadelphia Co., emphasized the trouble caused dealer and distributor service men by the factory making changes on current models before notifying the service men of the changes and providing them with the necessary materials and information to service the changed designs. He urged that more cooperation be obtained between designing engineers and the factory service manager so that contemplated changes may be known to the latter who will then see to it that his field forces are properly equipped to handle possible complaints.

Maryland Bus Operators Must Add Equipment

BALTIMORE, Dec. 22—The Public Service Commission has adopted new rules for the regulation of bus transportation in Maryland, which apply to all motor bus companies operating in the state. Among the changes in the rules, which become operative on the first of the year, are requirements that each bus be equipped with a stop light, heating system, fire extinguisher and an emergency exit in the rear.

Another new rule applying to operators of four or more buses, requires each bus to bear a distinguishing color. One of the newly promulgated regulations, that forcing each bus to have a speedometer, was suggested by E. Austin Baughman, commissioner of motor vehicles, and another, requiring rear-view mirrors, was recommended by John N. Mackall, chairman of the state roads commission.

French Parts Makers Pursue Standardizing

WASHINGTON, Dec. 20—The movement initiated by the automobile and accessories manufacturers of France to standardize their products is meeting with success, according to advices sent the Department of Commerce. The department is advised that the French manufacturers of parts and accessories have set up a "Bureau of Normalization" for the purpose of supervising the work of standardization in that part of the field.

Firestone Earnings Reach \$13,780,966

NEW YORK, Dec. 19—Firestone Tire & Rubber Co. reports net income for the year ended Oct. 31 as \$13,780,966 after depreciation, charges and Federal taxes, equal after preferred dividend to \$33.89 a share earned on the common stock. This compares with \$7,622,339, or \$16.90 a share, in the previous year.

At the directors' meeting yesterday this company declared a regular quarterly dividend of \$1.50 a share and a \$2 extra dividend on the common stock, payable Jan. 20 and Jan. 1 to stockholders of record Jan. 10 and Dec. 20, respectively. The board of directors also approved placing the common stock on a regular \$8 annual basis for next year, as against the \$6 basis now ruling.

This has been one of the most profitable years in the history of the company, according to Harvey S. Firestone, president. The company's Canadian subsidiary is completing an extension to its plant which will increase its capacity 60 per cent.

Selden Increases Output

ROCHESTER, N. Y., Dec. 17—Selden Truck Corp. has doubled production at its plant here to meet the demand for the new Roadmaster six-cylinder three-ton speed truck brought out early in the summer and the improved Pace-maker line recently announced. According to C. G. McDonough, sales manager, the present year has been the most profitable in the company's history since 1919.

Takes New York Building

NEW YORK, Dec. 17—General Motors Co. has leased the entire four-story building at Broadway and Sixty-second St. The lease is for a long term and is to start Oct. 1, 1928. The Chevrolet branch of General Motors will occupy the entire building as its New York sales room for passenger cars and motor trucks.

Financial Notes

Gardner Motor Co., Inc., reports a loss of \$41,666 for the quarter ended Sept. 30, after expenses and other charges. For the first nine months of the year the company shows profit of \$99,292. The balance sheet as of Sept. 30 shows total assets of \$1,416,373 against \$1,447,644, Jan. 1. There is a decline of \$18,000 in cash, \$54,000 in receivables, and an increase of \$20,000 in inventories.

Midland Steel Products Co has declared extra dividends of \$1 a share on the preferred stock and 48 cents on the common, in addition to the regular quarterly dividends of \$2 on the preferred and \$1 on the common, all payable Jan. 1 to stock of record, Dec. 22.

Security Trust Co., trustee for Columbia Motor Car Co., is distributing the remainder of the bankrupt estate in accordance with orders of referees in bankruptcy. The dividend is 3 1/4 per cent on proved claims of creditors. This makes total distribution 14 1/4 per cent.

Guaranty Company of Maryland, a financing company capitalized at \$5,000,000, has been placed in the hands of receivers with the consent of officers. Liabilities were set at \$3,700,000 and assets at \$2,050,000, of which \$750,000 cannot be realized.

New York Stock Exchange has listed for trading 11,314 shares of Federal Motor Truck Co. no par stock as an additional listing and \$20,000,000 worth of \$10 par capital stock of Reo Motor Car Co. as a new listing.

Larrabee-Deyo Motor Truck Co., Inc., is marketing a new issue of 25,000 shares of no par Class A stock at \$25 a share.

Miniger Sees Increase of 1,000,000 Cars in 1928

TOLEDO, Dec. 17—Prediction that there will be 1,000,000 more automobiles made and sold in 1928 than in the present year was made by President C. O. Miniger of the Electric Auto-Lite Co.

"We feel there will be 1,000,000 more cars produced in 1928 and that our company will get a good share of the ignition, starting and lighting business," reported the president.

"We have completed our expansion program begun more than a year ago and have retired all our bank debt."

The company has shared in some of the preliminary Ford business and may get considerable extra volume from that source during 1928.

Spain to Grow Rubber

NEW YORK, Dec. 17—Spain is contemplating the use of land in Spanish Morocco and the Muni River Colonies for the cultivation of rubber, according to a report from Madrid. The Spanish government is studying the idea and will send experts to make investigations in certain sections where rubber is already being grown.

Automotive Buyers Cover Steel Needs

Encouraging Volume of First
Quarter Business Reported
Placed With Mills

NEW YORK, Dec. 21—Holiday cheerfulness prevails in the steel market. An encouraging volume of first quarter business has been placed by automotive consumers in response to suggestions that they avail themselves of the opportunity to cover requirements at prevailing price levels, coupled with intimations of advances after the turn of the year. While the market's undertone is decidedly firmer it will depend altogether upon developments after the first half of next month whether demand will suffice to support moderate advances.

Motor car manufacturers as well as parts makers will very likely have covered most of their January steel needs before the end of the year. Before they face the problem of commitments at higher prices, visibility of general business conditions, at least over the year's first quarter, will be much better. Two years ago there was an advance in steel prices, especially in sheets, early in December, but subsequent developments caused a progressive downward reaction.

Automobile body stock rollers are in hopes of establishing a 4.15 cent market for full finished sheets before their 4 and 4.05 cent orders have been cleaned up. Strip mills have booked first quarter business at extremely low prices but the market is less ragged. Finishers of cold steel bars are in much better shape with reference to first quarter orders than current business which hardly keeps more than half of their capacity occupied. The price for first quarter shipment is 2.20 cents, Pittsburgh, with a concession of \$2 per ton to large tonnage buyers. Automotive alloy steel specialists have received considerable first quarter business in the last few days.

Pig Iron—Blast furnace interests are striving hard to obtain somewhat better prices, the base price of \$17.50, Valley furnace, being more uniformly adhered to as asking price. Heavy tonnage consumers insist on concessions. Automotive foundries appear to be well covered.

Aluminum—The sole domestic consumer, importers, and dealers continue to live in hopes that 1928 automotive demand will be much better. The fact that aluminum plays a more important role in low-priced passenger cars is chiefly responsible for these expectations. While quite a little forward business appears to be under negotiation, immediate demand is rather light. The price situation is unchanged.

Copper—The copper market has turned quiet and slightly easier. Producers, however, are not pressing any metal for sale and holding it at 14½ cents.

Tin—The market is marking time. Consumers are offish and speculative interests disposed to minimize their commitments over the holiday period as much as possible.

Japan Sells Cars Despite Depression

WASHINGTON, Dec. 20—The automobile industry in Japan during the present fiscal year is the one exception to a year of otherwise general business depression in that country, according to a survey of the automobile industry in Japan, just forwarded to the Department of Commerce by its trade representative in Tokio.

Imports of cars and trucks during the first nine months this year total 2728 units as against 1619 for the first nine months of last year.

Tire Stocks Lower, Tubes Show Increase

NEW YORK, Dec. 19—Production of all types of pneumatic casings was less than total shipments during October, resulting in a decreased inventory, with a reverse condition true with regard to all types of inner tubes, according to the Rubber Association of America. Inventories of balloon casings and inner tubes both declined, while those of high pressure cord casings and inner tubes advanced.

Balloon Casings			
	Inven- tory	Produc- tion	Ship- ments
Nov. 1927...	3,764,591	1,683,003	1,809,385
Oct. 1927...	3,927,917	1,807,924	2,132,318
Oct. 1926....	3,070,060	1,755,646	1,668,051
Balloon Inner Tubes			
Nov. 1927...	4,965,306	1,415,650	1,607,119
Oct. 1927....	5,152,658	1,599,987	2,046,955
Oct. 1926....	4,358,084	1,786,536	1,649,595
High Pressure Cord Casings			
Nov. 1927...	3,290,601	1,830,171	1,710,288
Oct. 1927...	3,151,501	1,755,119	2,051,117
Oct. 1926....	3,750,731	1,916,053	1,560,399
High Pressure Inner Tubes			
Nov. 1927...	5,189,388	2,383,346	2,161,449
Oct. 1927....	4,980,749	2,638,606	3,021,458
Oct. 1926....	7,588,923	2,869,433	2,456,252

Moline Stamping Company Takes Over Wilson Plant

MOLINE, Dec. 17—Articles of incorporation have been issued the Moline Stamping & Mfg. Co., successor to the E. H. Wilson Mfg. Co., builder of automobile bodies, and operations were begun at the factory this week on a small scale under the new ownership. James P. Pearson of this city, H. C. Priester and William Mueller, Davenport, are incorporators of the company which is organized with \$475,000 preferred stock and 30,000 shares no-par common. An organization meeting will be held soon to complete details of the new company executive personnel.

Creditors of the Wilson company will receive about 33 1/3 per cent on their claims under the distribution plan of L. L. Harr, receiver for the plant.

Leading Ohio Zones Show Sales Decrease

November Totals Range Be-
low Marks for October and
for Former Year

COLUMBUS, Dec. 19—Sales in five leading Ohio counties showed sharp decreases in November from the October totals and also showed decreases under the same month last year and under the 11 months period of the former year. The figures were compiled by the bureau of business research of Ohio State University.

Sales in Cuyahoga county in November totaled 1228 against 1671 in October. They were 37 per cent under November, 1926, and were down 16 per cent for the 11 months. Hamilton county sales in November were 815 against 962 in October. They were 11 per cent under November last year and 11 per cent lower for the 11 months. Lucas county showed 362 sales against 506 in October and was 31 per cent under the former November and 16 per cent under the former 11 months. Franklin county sales were 563 against 720 in October, 14 per cent under the former November and 17 per cent under the 11 months. Summit county showed 362 sales against 502, and dropped 26 per cent from the former November and 9 per cent for the 11 months.

New Jersey Sales 92,391

NEW YORK, Dec. 17—Sales of new passenger cars in the state of New Jersey during the month of November were 3232 and for the 11-months period were 92,391, according to Sherlock & Arnold. This figure compares with 99,129 sales in all of New Jersey during the 11-months period of 1926.

Wisconsin Sales Total 2731

MILWAUKEE, Dec. 17—In view of the fact that Ford was completely out of the picture, the Wisconsin passenger car trade did an excellent business during November. New car registrations for the month were 2731, compared with 2913 in the same month last year and 2997 in 1925.

Plan Electric Truck Sales

NEW YORK, Dec. 19—Electrical Industrial Truck Manufacturers have approved plans for 1928 calling for general publicity work and local cooperative campaigns in a number of leading cities. The advisory committee for 1928 includes P. W. Saitta, Crescent Truck Co., chairman; W. Van C. Brandt, Electrical Storage Battery Co.; G. E. Stringfellow, Edison Storage Battery Co.; M. A. Watterson, Baker-Raulang Co.; C. B. Cook, Elwell Parker Electric Co.; H. J. Fuller, Yale & Towne Mfg. Co., and E. R. Kleindinst, Automatic Transportation Co.

Massachusetts Seeks State Traffic System

BOSTON, Dec. 17—The Massachusetts Department of Public Works has taken a definite step to uniformity of traffic by submitting to the legislature a report recommending that it be charged with formulating a uniform system of traffic control. In the report, which followed a request from the legislature as to the advisability of such a matter, it says:

"In order to accomplish this the department should be authorized to establish as through ways, in addition to state highways, such other important through routes or parts thereof as it from time to time may deem advisable, and for all through routes so established to formulate rules and regulations governing the movement of vehicles thereon, including the erection and maintenance of warning, informational and directional signs."

To make this further uniform the report suggests that the state department be given control over local regulations by requiring that all such about to be passed by cities and towns not be allowed to go into effect until they first get the approval of the Department of Public Works. It adds that this is in line with the effort to standardize traffic conditions so far as may be consistent with local conditions.

N. Y. Show Days Assigned

NEW YORK, Dec. 17—Days at the National Automobile Show in New York have been set aside for different groups as follows: Saturday, Jan. 7, General Opening Day. The show will not be open on Sunday. Monday, Jan. 9, has been designated Dealers' Day; Tuesday as Aviation Day; Wednesday as Society Day; Thursday as Army, Navy and Society of Automotive Engineers' Day; Friday as Theatrical Day, and Saturday, Jan. 14, Civic and Closing Day.

S.A.E. Meeting Jan. 9

NEW YORK, Dec. 17—The Metropolitan Section of the Society of Automotive Engineers will hold its Show Meeting at the Hotel Commodore, Jan. 9.

Coming Feature Issues of Chilton Class Journal Publications

Jan. 1—National Shows Number—Automobile Trade Journal.

Jan. 5—National Shows Issue—Motor Age.

Feb. 18—Statistical Issue—Automotive Industries.

Motor Vehicle Traffic Called Shipping Menace

WASHINGTON, Dec. 17—Automobiles and motor vehicle traffic is becoming a serious menace to shipping, the delegates to the twenty-third annual convention of the National Rivers and Harbors Congress, held here this week, were told by J. Hampton Moore, former Mayor of Philadelphia, at the opening session held at the Willard Hotel.

"Navigation is seriously threatened by the construction of bridges to accommodate the rapidly increasing motor travel," he declared. "Shipping interests should take prompt steps to protect itself."

To obtain this protection, the congress adopted a resolution to ask the United States Congress to establish a standard of vertical clearances for major ports of the United States. Further, an attempt will be made to have the government call an international conference for the purpose of standardizing bridge clearances in the ports of the world.

Moock Urges Diversification

ATLANTA, Dec. 17—Dealers must diversify their businesses and become automotive merchants, selling all forms of automotive merchandise and service intelligently if they are to make money in the face of increasing competition, Harry G. Moock, director of Greater Market Development of the Automotive Equipment Association, told members of the Atlanta Automobile Association at the annual meeting here today.

Garages to Adjust Car Owner Damages

SAN FRANCISCO, Dec. 17—A number of the leading garages and repair shops in California will be in a position soon to render immediate service on insurance damages, and to settle claims at once, under a plan now being carried out by the Pacific Coast Automobile Underwriters' Conference, which is seeking to facilitate adjustments of losses to policy holders in member companies without the delay now necessary.

This means that motorists on the road, meeting with an accident of any kind, will have the right to call on the nearest of these authorized garages to tow his car in, make repairs, and adjust the claim at once, without waiting for the arrival of a direct representative of the insuring company. The plan has been tried out tentatively in three widely-separated sections of northern California, and has proved successful. It is now to be applied to the whole state, according to announcement by the conference. The garages selected will act in the capacities of expert adjusters, appraisers and claims men, immediately on being informed of an accident.

Extends Air Mail Service

NEW YORK, Dec. 17—The Colonial Western Airways, Inc., is planning the early inauguration of mail, passenger and express service between Buffalo and Cleveland, according to Major General John F. O'Ryan, president. This mail service will be an extension of the Albany to Cleveland contract which was awarded to this company last July by the government.

Fairchild cabin monoplanes, powered by Wright Whirlwind engines, have been chosen as standard equipment for this division.

Black on Three Shifts

OIL CITY, PA., Dec. 17—The J. C. Black Mfg. Co., manufacturer of automobile radiators, went into production on a three-shift basis Nov. 15. The company manufactures the Standitall radiator which is designed to withstand extremes of temperature.

Calendar of Coming Events

SHOWS

All Western Road Show, Los Angeles, March 7-11
American Road Builders Association, Public Auditorium, Cleveland, Jan. 9-13
*Boston, Mechanics Bldg., March 10-17
*Chicago, National Automobile Chamber of Commerce, Coliseum, Jan. 28-Feb. 4
International Aircraft Show, Berlin, March 23-April 11
*New York, National Automobile Chamber of Commerce, Grand Central Palace, Jan. 7-14
Rio de Janeiro, May 3-13
Salon, Automobile Salon, Inc., Hotel Drake, Chicago, Jan. 28-Feb. 4

*Will have special shop equipment exhibit.

Salon, Automobile Salon, Inc., Hotel Biltmore, Los Angeles, Feb. 11-13
Salon, Automobile Salon, Inc., Palace Hotel, San Francisco, Feb. 25-March 3
United States Good Roads Show, Des Moines, May 28-June 1

CONVENTIONS

American Road Builders' Assn., Hotel Hollenden, Cleveland, Jan. 9-13
American Road Builders' Association, Banquet, Hollenden Hotel, Cleveland, Jan. 11
Automotive Equipment Association, Grand Hotel, Mackinac Island, June 10-16

National Automobile Dealers Ass'n., Annual Meeting, Palmer House, Chicago, Jan. 31-Feb. 2
National Battery Mfrs. Assn., Chicago, Feb. 15-16
National Foreign Trade Council, Houston, Texas, April 25-27
Society of Automotive Engineers, Annual Meeting, Detroit, Jan. 24-27
United States Good Roads Association and Bankhead National Highway Association, Des Moines, May 28-June 1

RACE

Daytona Beach, Fla., series of stock car races and world's speed trials, Jan. 31-Feb. 8